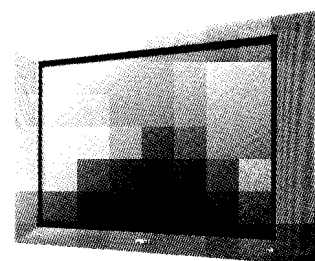


Service
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FTV1.9DE

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Service Manual

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PHILIPS

1. Technical specifications

1.1 Technical data D-box

Mains voltage	: 85 - 264Vac
	: 50Hz - 60Hz
Power dissipation	: 400W
Stand-by dissipation	: < 1W

1.2 Connection facilities

1.2.1 Specification of the terminal sockets

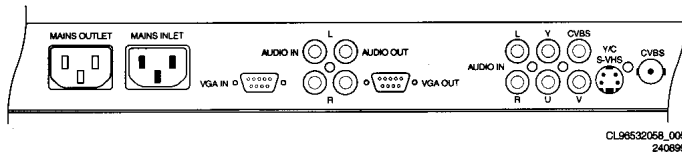


Figure 1-1

VGA-in

- 1 - R (0.7Vpp 75Ω)
- 2 - G (0.7Vpp 75Ω)
- 3 - B (0.7Vpp 75Ω)
- 4 - Reserved
- 5 - Bus-gnd
- 6 - R-gnd
- 7 - G-gnd
- 8 - B-gnd
- 9 - RC5
- 10- GND
- 11- Config_Ident
- 12- Bus1 (TxD/
Rxd or SDA)
- 13- Hsync
- 14- Vsync
- 15- Bus2 (TxD/
Rxd or SDA)

VGA-out

- 1 - R (0.7Vpp 75Ω)

- 2 - G (0.7Vpp 75Ω)
- 3 - B (0.7Vpp 75Ω)
- 4 - Reserved
- 5 - gnd
- 6 - R-gnd
- 7 - G-gnd
- 8 - B-gnd
- 9 - Reserved
- 10- GND
- 11- Reserved
- 12- Reserved
- 13- Hsync
- 14- Vsync
- 15- Reserved

Audio VGA-in

- Cinch Audio L(0.5Vrms >= 10kΩ)
- Cinch Audio R(0.5Vrms >= 10kΩ)

Audio VGA-out

- Cinch Audio L(0.5Vrms >= 1kΩ)
- Cinch Audio R(0.5Vrms >= 1kΩ)

SVHS

- 1 - GND
- 2 - GND
- 3 - Y (1Vpp / 75Ω)
- 4 - C (0.3Vpp / 75Ω)

Audio_in:

- Cinch Audio L (0.5Vrms >= 10kΩ)
- Cinch Audio R (0.5Vrms >= 10kΩ)

CVBS

- BNC - CVBS (1Vpp / 75Ω)

YUV

- Y (1Vpp / 75Ω)
- 3 - U (1Vpp / 75Ω)
- 4 - V (1Vpp / 75Ω)

1.3 Chassis overview

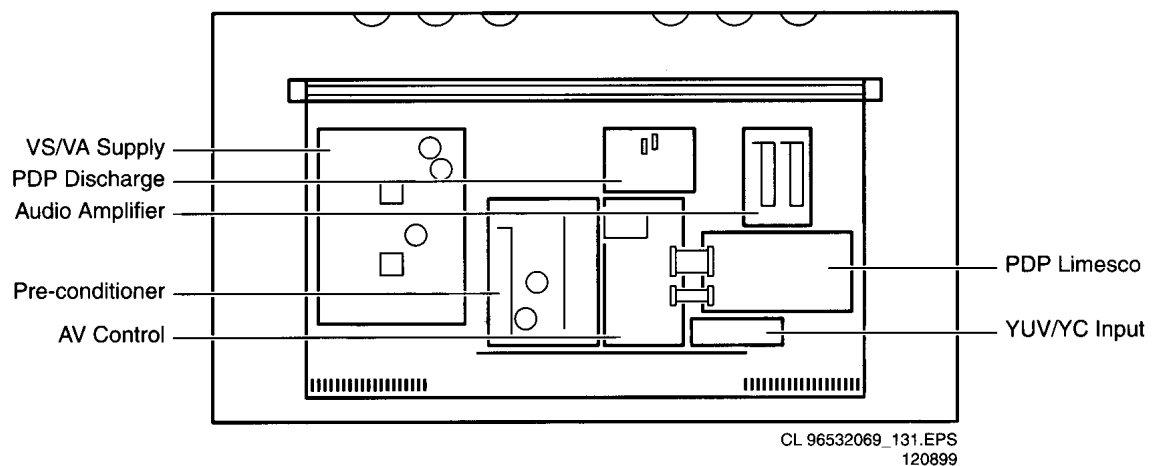


Figure 1-2

2. Safety instructions, warnings and notes

2.1 Safety instructions

It is not allowed to operate the FTV-set without glass plate. One function of this glass plate is to absorb Infrared Radiation. Without this glass plate the level of Infrared Radiation produced by the plasma display could damage your eyes.

1. Safety regulations require that during a repair:
 - the set should be connected to the mains via an isolating transformer (in this particular case a transformer of ≥ 800 VA);
 - safety components, indicated by the symbol , should be replaced by components identical to the original ones;
2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
 - Note: The wire trees should be routed correctly and fixed with the mounted cable clamps.
 - The insulation of the mains lead should be checked for external damage.
 - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets that have a mains isolated power supply). This check can be done as follows:
 - unplug the mains cord and connect a wire between the two pins of the mains plug;
 - set the mains switch to the on position (keep the mains cord unplugged!);
 - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between $4.5\text{ M}\Omega$ and $12\text{ M}\Omega$;
 - switch off the TV and remove the wire between the two pins of the mains plug.
 - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

4. If DST reacts with 'error 2', there is no communication between set and DST. Note that IR-transmitter LED is positioned at right side of IR-receiver eye of the E-box. Take into account that receiver-LED on DST is positioned not in the middle but at the left side. Point corresponding LED's to each other. In case the amount of Infrared produced by the screen pollutes the communication, the set can be set in Standby-mode. Then still the error-messages can be retrieved.

2.2 Warnings

1. ESD

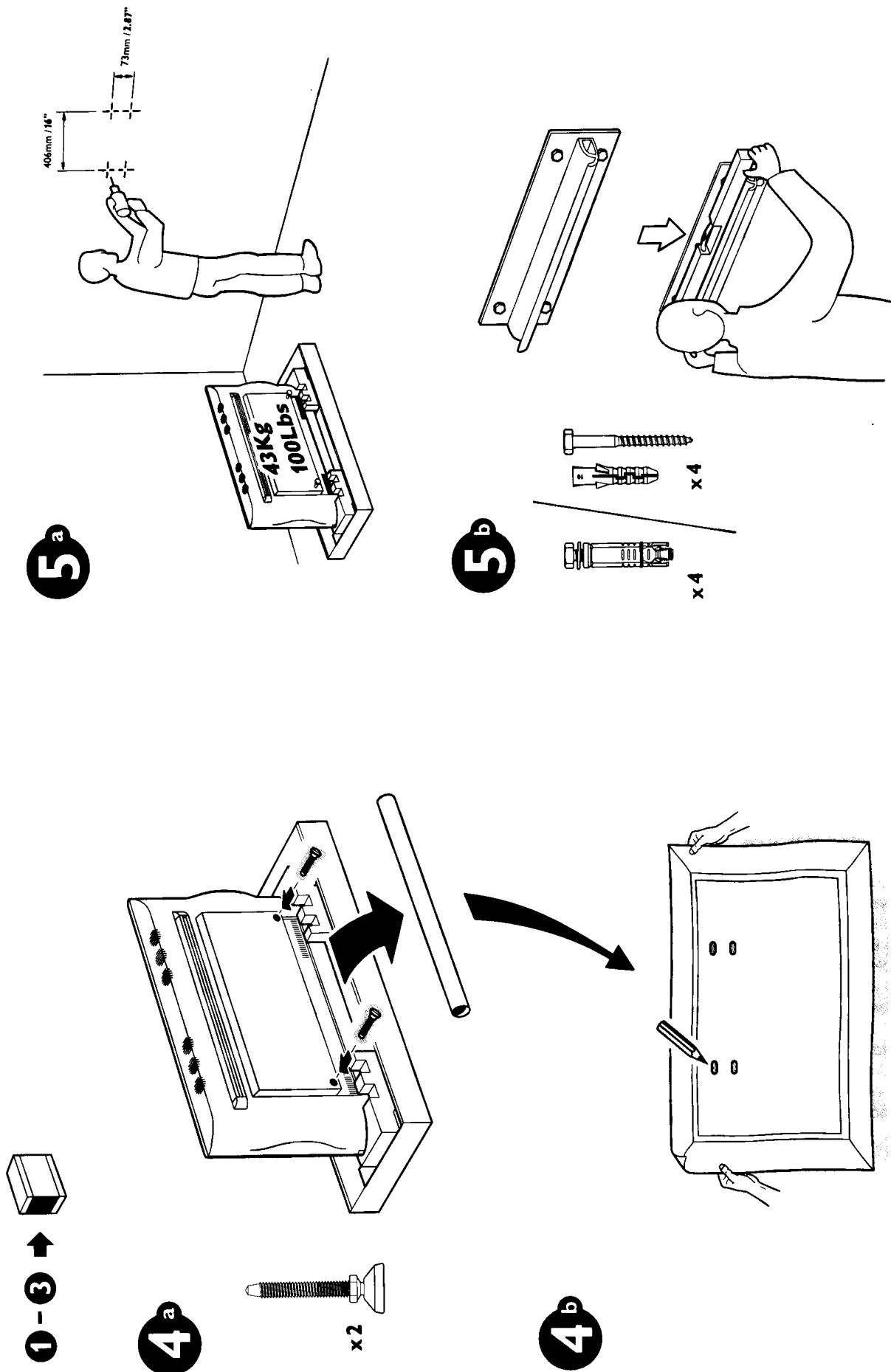
All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.

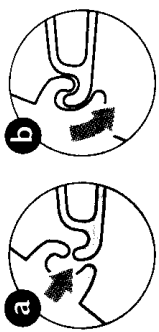
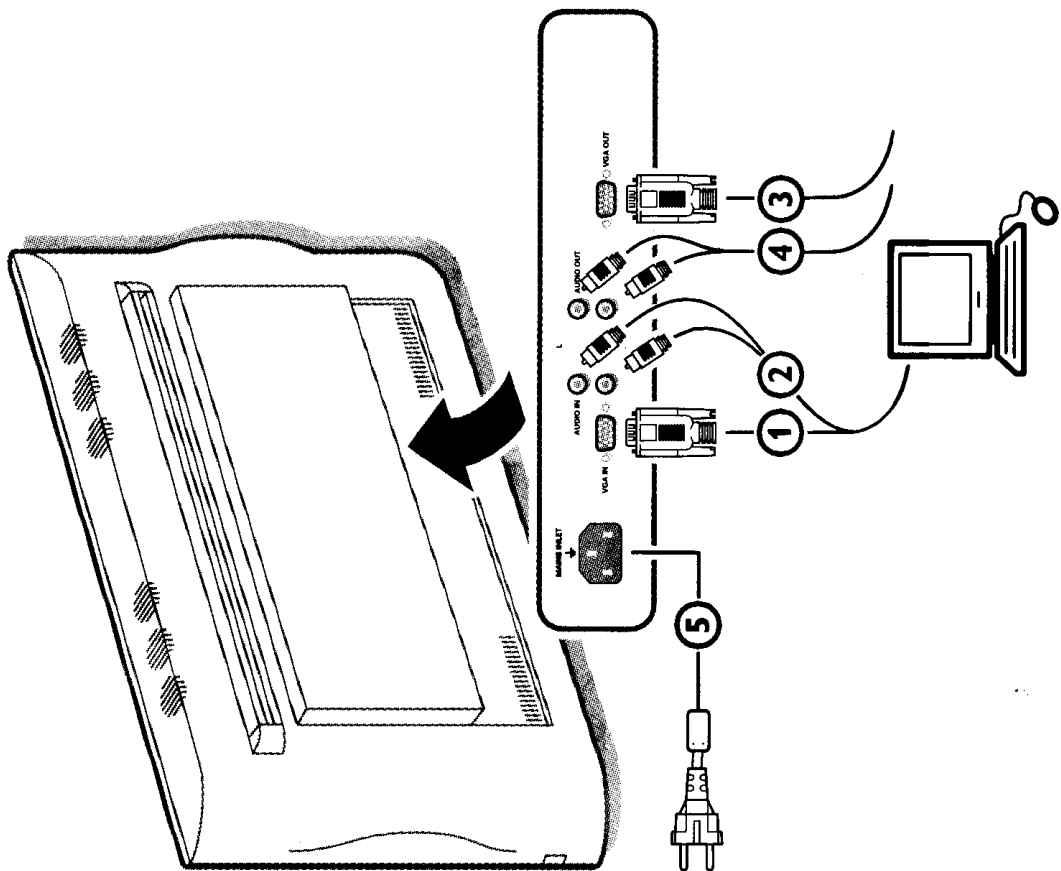
1. Available ESD protection equipment:
 - complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
 - wristband tester 4822 344 13999
2. Never replace modules or other components while the unit is switched on.
3. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

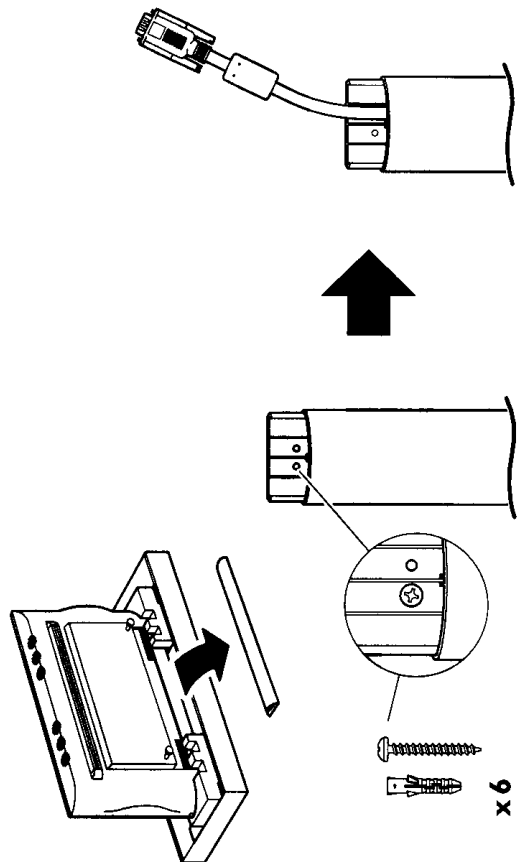
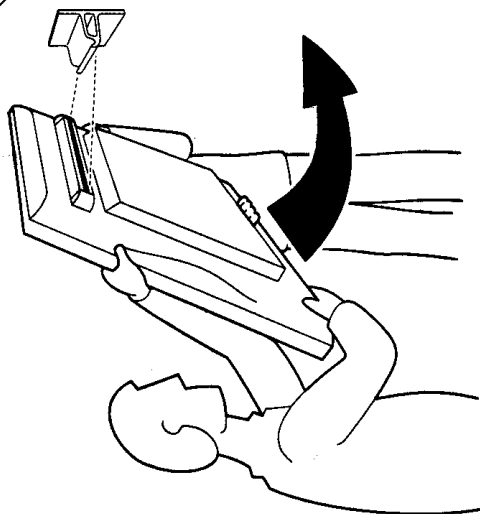
1. A glass plate is positioned before the plasma display. This glass plate can be cleaned with a slightly humid cloth. If due to circumstances there is some dirt between the glass plate and the plasma display panel it is recommended to do some maintenance by a qualified service employee only.
2. Never disconnect the power display cable when the set is operating
3. With DST no failures (error-codes) can be red, when the set is in Service-mode.

3. Directions for use





6



Unpacking and wall mounting instructions

For the unpacking instructions follow the illustrated steps printed on the packaging (outside and inside).

For the wall mounting instructions follow the illustrated steps ④ to ⑥ printed on the first pages of this instruction booklet.

Make sure that the wall mount is being fixed securely enough so that it meets safety standards. The weight of the monitor (excl. packaging) is about 43 kg.

Connect your computer

- ① Connect one end of the VGA cable ① supplied to the video card of the computer and the other end to the **VGA IN** connector at the rear side of the monitor. Fix the connectors firmly with the screws on the plug.
- ② In case of a Multimedia computer, connect the audio cable ② to the audio outputs of your Multimedia computer and to the **AUDIO IN R** (right) and **L** (left) inputs of the monitor.

Daisy chaining

The Active Loop Through facility makes it possible to make a daisy chain with a second VGA monitor.

- ③ Connect one end of another VGA cable ③ to the **VGA OUT** connector at the rear side of the monitor and the other end to the **VGA IN** connector of a second VGA monitor.
- ④ In case of a Multimedia computer, also connect the audio cables ④ to the **AUDIO L** and **R** outputs of the monitor and to the **AUDIO IN L** and **R** inputs of the second VGA monitor.

Note: only use the VGA cables supplied or use cables that are specially delivered with the monitor.

Connect your Apple Macintosh* computer

Attention: Macintosh computers with separate H and V synchronisation signals can be used together with the supplied adaptor. Macintosh computers with Composite Sync and Sync on Green signals may need a special (not supplied) adaptor or cable. Contact your dealer.

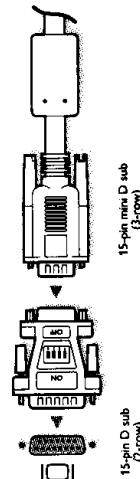
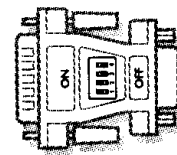
Connect the supplied switchable adaptor for Apple video connectors to one end of a VGA cable.

Put the DIP switches on the adaptor in the following positions :

- | | | | |
|-----|-----|----|----|
| 1 | 2 | 3 | 4 |
| off | off | on | on |

Connect the end of the VGA cable with the adaptor to the video card of the computer and the other end to the **VGA IN** connector on the back of the monitor.

Screw the connectors down firmly.



Computer Display modes

VGA	640x480	31.468 kHz	60 Hz
VGA	640x400	31.468 kHz	70 Hz
VGA	640x350	31.468 kHz	70 Hz
MAC II	640x480	35.000 kHz	67 Hz
SVGA	800x600	35.156 kHz	56 Hz
XGA	1024x768	45.000 kHz	56 Hz

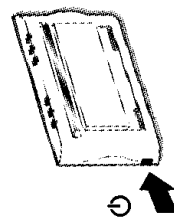
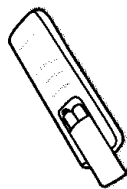
When a VGA computer is connected, the selection is made automatically.

A message is displayed when the monitor does not support one of the above mentioned VGA modes.

Switch your computer to a correct display mode.

Operation

- ① **Insert the mains plug ⑤** (see previous page for the illustration) supplied into the mains inlet at the back of the monitor and in the wall socket. Please, only use the supplied rim-earthed mains cord with its built-in filter.
- ② **Remote control:** remove the cover of the battery compartment. Insert the 2 batteries supplied (Type LR6AA-1.5V).
The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries batteries may not be disposed of with your household waste. Please check on how to dispose of batteries according to local regulations.
- ③ **Switch the monitor on :** Press the power button ⑥ at the right side of the monitor.
A green indicator lights up and the screen comes on.
When the monitor does not receive a certain VGA signal the screen remains black.
Make sure that your PC is switched on and is in the correct display mode.



4. Mechanical instructions

4.1 Introduction:

There are pre-defined service positions for the following panels:

1. VS/VA SUPPLY panel.
2. PDP DISCHARGE panel.
3. AUDIO AMPLIFIER panel.
4. PRE-CONDITIONER panel.
5. AV CONTROL panel.
6. PDP LIMESCO panel.
7. YUV/YC INPUT panel.
8. LED DISPLAY panel.
9. SWITCH DISPLAY panel.

Before these panels can be accessed, the rear cover has to be removed:

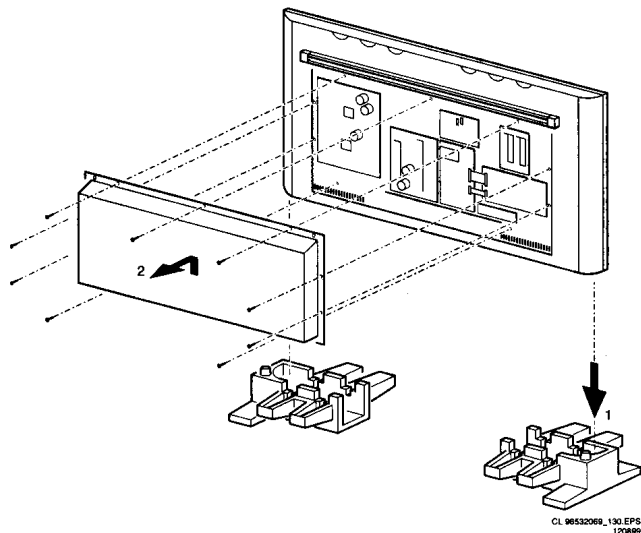


Figure 4-1

1. Place the Display Box in the service stand via 2 reinforced cushions (order code: 3122 126 30181).
2. Remove the 9 fixation screws of the rear cover.
3. Remove the rear cover (during removal push it slightly upwards).

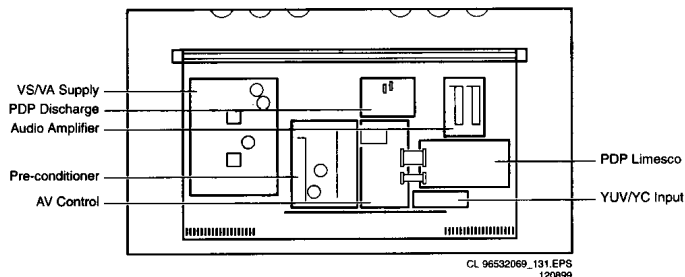


Figure 4-2

1. All panels are now accessible.

4.1.1 VS/VA SUPPLY panel.

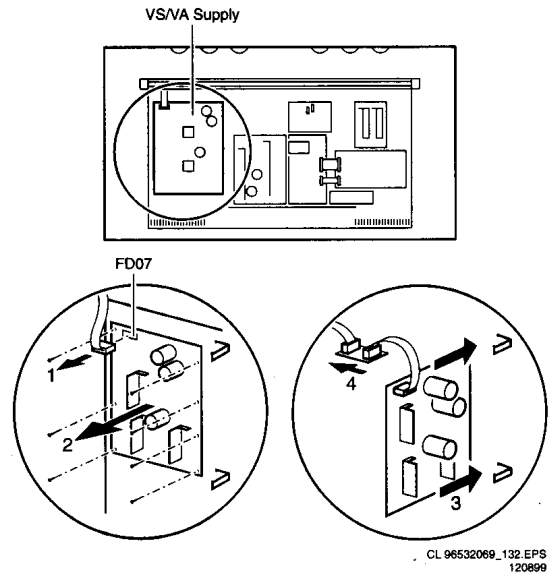


Figure 4-3

1. Disconnect Fan Supply cable from connector FD07 in the upper left corner [1].
2. Remove the 7 fixation screws of the panel [2].
3. Place panel on the 2 hinges, which are located near the right corners of the panel [3].
4. Use the mechanical service part (extension cable assembly, 12NC: 3122 785 90006) to extend the Fan Supply cable [4].
5. The copper side is now accessible from the left.

4.1.2 PDP DISCHARGE panel.

As in the FTV 1.5, this panel must be exchanged completely if defective.

4.1.3 AUDIO AMPLIFIER panel.

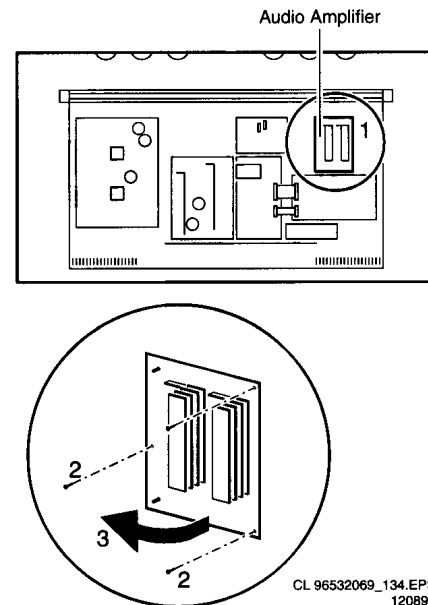


Figure 4-4

1. Some testpoints are accessible at the B-side [1].
2. If this is not sufficient, remove the 3 fixation screws of the panel [2].
3. Panel now can be hinged on the left side to access the A-side (soldering side) [3].

4.1.4 PRECONDITIONER panel.

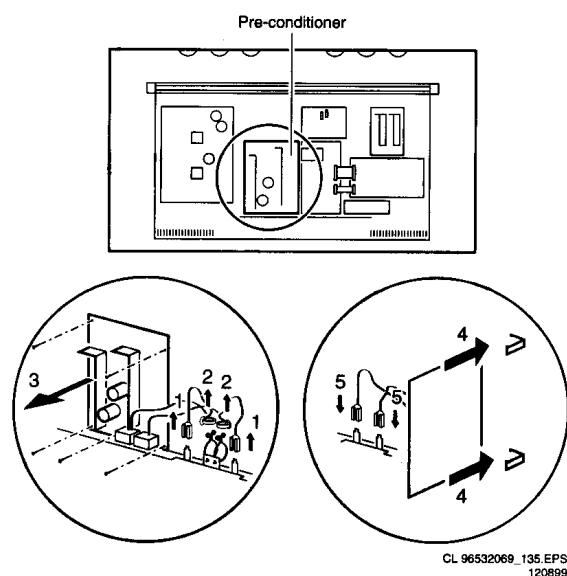


Figure 4-5

1. Disconnect the 2 grounding wires from the shielding plate by pressing the small lever on the connector while pulling [1].
2. Remove the 2 ferrite ring cores from their fixations [2].
3. Remove the 5 fixation screws of the panel [3].
4. Place panel on the 2 hinges, which are located, near the left corners of the panel [4].
5. Reconnect grounding wires to the extra connectors on the shielding plate at the left side [5].
6. The copperside becomes accessible now from the right side.

4.1.5 AUDIO VIDEO CONTROL panel.

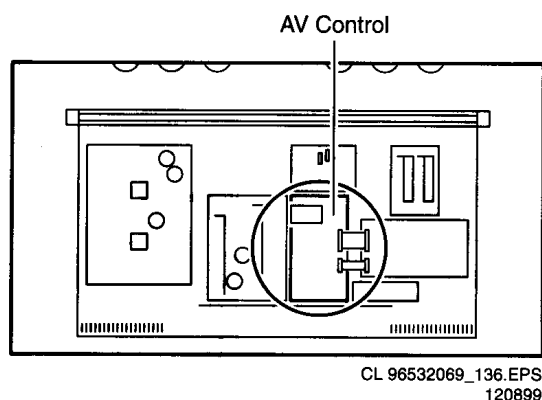


Figure 4-6

This panel has no service position for accessing the A-side, however all service test points are accessible at the B-side (see Service Manual).

In case some components must be (de)soldered, all fixation screws (6 for the panel, 5 at the metal connector plate) and all cables must be removed to access the A-side.

4.1.6 PDP LIMESCO panel.

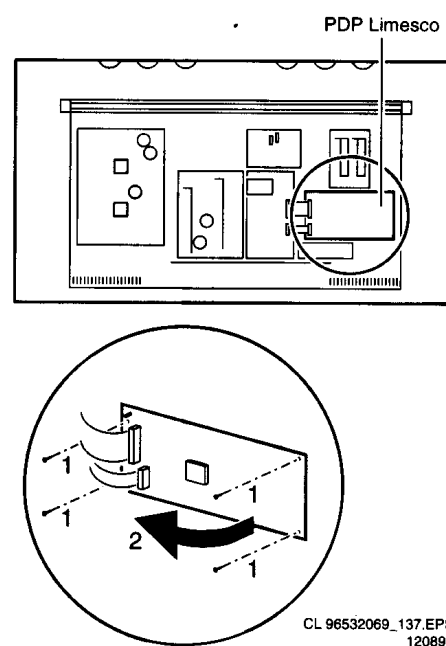


Figure 4-7

All SMC's are located on the B-side, so all testpoints are accessible. In case some components must be (de)soldered, the hinge construction can be used to access the A-side.

1. Remove the 4 fixation screws of the panel [1].
2. Panel can now be hinged to access soldering side [2].

4.1.7 YUV/YC INPUT panel.

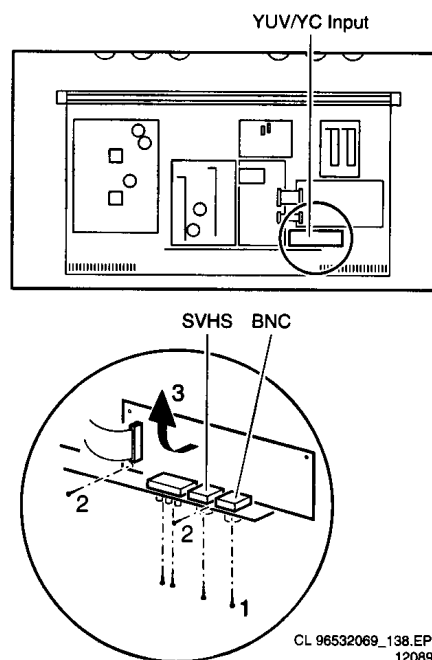


Figure 4-8

This panel has no pre-defined service position. For access of the A-side, the panel has to be removed:

1. Remove the 4 screws at the metal connector plate [1].
2. Remove the 2 fixation screws of the panel [2].
3. Panel can be removed now to access the A-side [3].

4.1.8 LED DISPLAY panel.

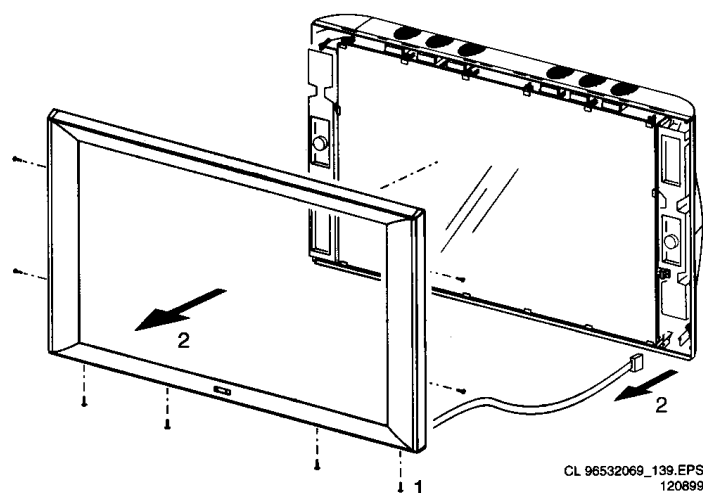


Figure 4-9

1. Remove 2 x 2 screws at the sides and 4 screws at the bottom of the front cover [1].
2. Remove the front cover (it hinges at the top). During removal unplug the cable of the LED DISPLAY panel at the SWITCH DISPLAY panel (connector SD11) [2].

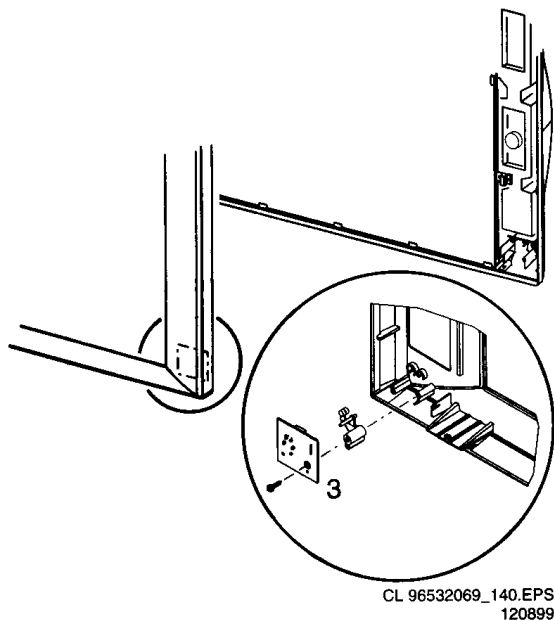


Figure 4-10

1. The LED DISPLAY panel can be removed now by unscrewing 1 fixation screw [3].

4.1.9 SWITCH DISPLAY panel.

1. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

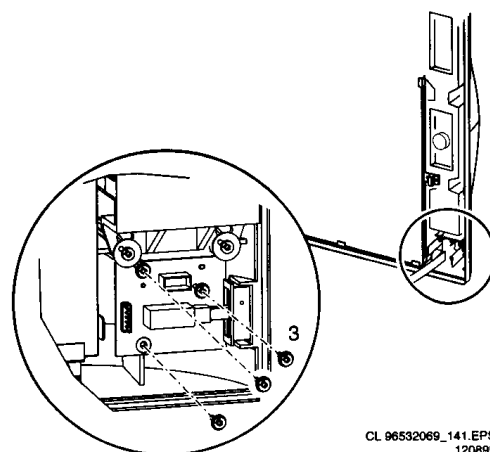


Figure 4-11

1. The SWITCH DISPLAY panel can be removed now by unscrewing 3 fixation screws [3].

4.2 Exchanging parts

Some parts of the FTV1.9 Display Box must be exchanged if defective:

1. GLASS PLATE.
2. LOUDSPEAKER.
3. PLASMA DISPLAY PANEL [PDP].

4.2.1 Exchanging of the GLASS PLATE.

1. First unplug (remove Mains and VGA cable) the Display Box .
2. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

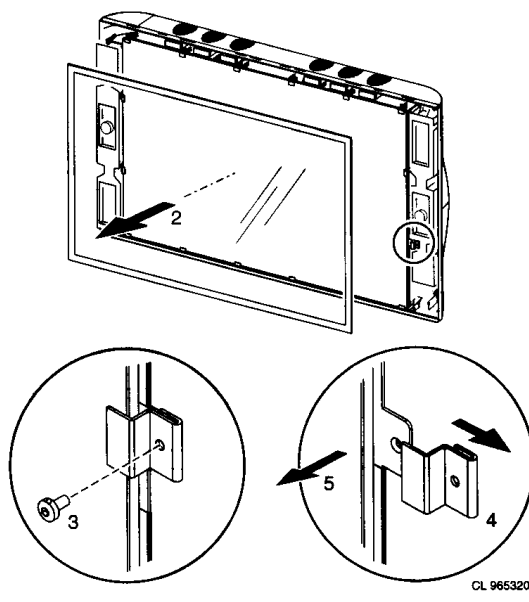


Figure 4-12

1. Now the GLASS PLATE can be removed by unscrewing all screws [3] and removing all glass clips [4].

4.2.2 Exchanging of a LOUDSPEAKER.

1. First unplug (remove Mains and VGA cable) the Display Box.
2. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

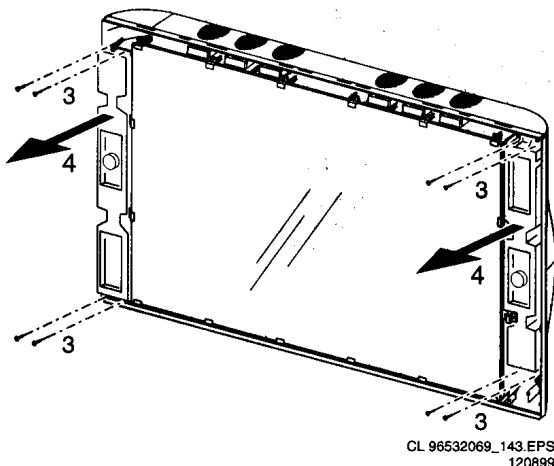


Figure 4-13

1. The LOUDSPEAKER can now be removed by disconnecting its cable and removing the 4 fixation screws at the top and bottom of the speakerbox. Be sure to remove the correct screws, otherwise the speaker system will be damaged (it is an airtight system).

4.2.3 Exchanging of the PDP.

1. First unplug (remove Mains and VGA cable) the Display Box.
2. Place the rear side of the Display Box on a foam cushion (be sure the metal rear cover is mounted in order to prevent damaging of the electronic panels).
3. Remove front cover (for a description see Chapter 1.1.8 LED DISPLAY panel).
4. Now the GLASS PLATE can be removed by unscrewing all screws and removing all glass clips (for a description see Chapter 1.2.1. 'Exchanging of the GLASS PLATE').

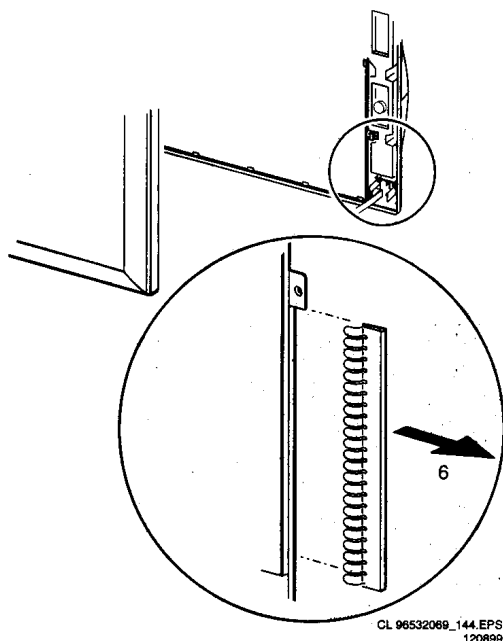


Figure 4-14

1. Remove all copper EMC SHIELDING springs mounted around the display [6].
2. Now flip the complete Display Box and place it with the Plasma Display down on a foam cushion. Be 100 % sure a large foam cushion is placed underneath the PDP, as it will drop about 10 mm after removing its fixation screws !!
3. Disassemble metal rear cover (for a description see Chapter 1.1 'Introduction').

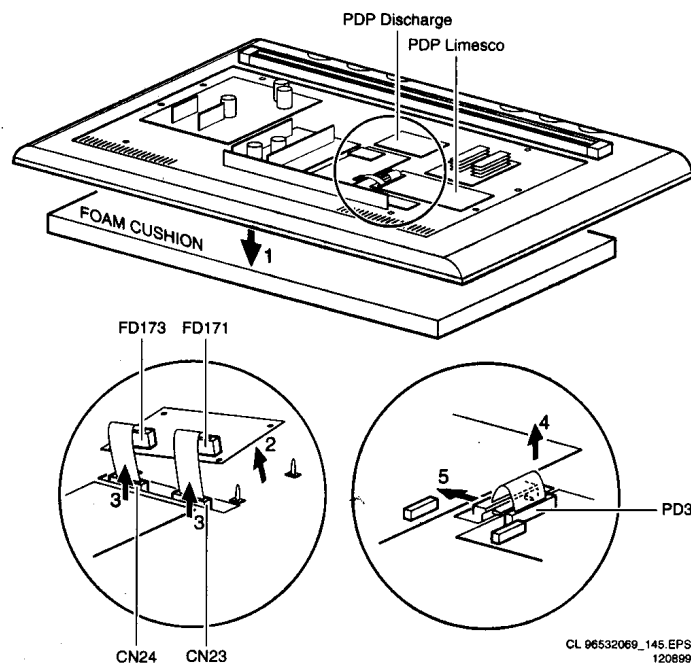


Figure 4-15

1. Disconnect the following cables:
 - Cables coming from connectors CN23 and CN24 of the PDP DISPLAY panel [3] (for easiest access lift the PDP DISCHARGE panel from its fixations [2]).
 - Flat cable on connector PD3 of the PDP LIMESCO panel [4]. Also remove the ferrite 'flat cable shield' completely by unlocking its fixations [5].

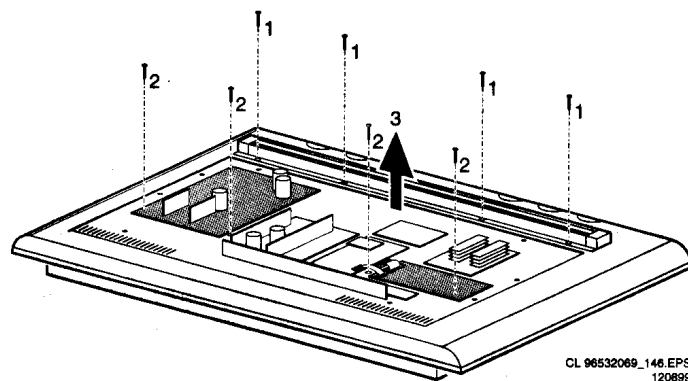


Figure 4-16

1. Now remove the 8 large screws which hold the PDP:
 - 4 screws are located at the top: they also hold the aluminium wall mount [1].
 - The other 4 are located at the bottom: the 2 outer screws are hidden behind panels. Therefore unscrew the VS/VA SUPPLY and the PDP-LIMESCO panel (grey panels) [2].
2. Lift encasing from PDP and replace PDP [3].

5. Service modes, fault finding and repair tips

For the FTV1.9, the Monitor can be used in two applications.

- A stand-alone configuration, a separate device which can also be sold and serviced separately.
- TV configuration, where the monitor is combined with the E-box.

The monitor, as a stand-alone unit, can be serviced by using a test pattern coming from the PDP-LIMESCO panel on the rear of the monitor itself or via a PC/laptop by using ComPair via the ComPair connector.

In this chapter the following paragraphs are included:

1. Test points
2. Dealer Service Tool (DST)
3. Service Modes
4. Error code buffer and error codes
5. The "blinking LED" procedure
6. Fault-finding tips
7. ComPair

5.1 Test points

The FTV1.9 chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- A1-A2-A3, etc.: Test points for the Audio amplifier (A)
- C1-C2-C3, etc.: Test points for the AV control circuit (AVC)
- FD1-FD2-FD3, etc.: Test points for the VsVa supply (FD1-FD2) and the PDP discharge panel
- L1-L2-L3, etc.: Test points for the PDP LIMESCO (PD1-PD9)
- PR1-PR2-PR3, etc.: Test points for the Pre-conditioner (PR1-PR3)
- Y1-Y2-Y3, etc.: Test points for the Y/C YUV monitor panel (UY1-YC4)

Measurements are performed under the following conditions:
Video: colour bar signal; Audio: 3 kHz left, 1 kHz right

5.2 Dealer Service Tool (DST)

For easy installation and diagnosis the dealer service tool (DST) RC7150 can be used. When there is no picture (to access the error code buffer via the OSD), DST can enable the functionality of displaying the contents of the entire error code buffer via the blinking LED procedure, see also paragraph 5.5. The ordering number of the DST (RC7150) is 4822 218 21232.

5.2.1 Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with pre-sets. 10 Different program tables can be programmed into the DST via a GFL TV-set (downloading from the GFL to the DST; see GFL service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277). For explanation of the installation features of the DST, the directions for use of the DST are recommended (For the FTV1.9 chassis, download code 4 should be used).

5.2.2 Diagnose features for service

FTV1.9 sets can be put in two service modes via the RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM).

5.3 Service Modes

Below described sequence is only valid for the "Monitor Only Configuration". When a Receiver box is connected to the

Display Box (TV Configuration), please check chapter 5 in the Training Manual of the Receiver Box.

5.3.1 Service Default Mode (SDM)

The purpose of the SDM is:

- Provide a situation with predefined settings to get the same measurements as in this manual.
- Access to the error buffer via the blinking LED procedure.
- Inspection of the error buffer.
- Possibility to overrule software protections via the service pins (caution: override of software protections!).

Entering the SDM:

- By transmitting the "DEFAULT" command with the RC7150 Dealer Service Tool (this works both while the set is in normal operation mode or in the SAM).
- By pressing on a standard RC the following sequence 0, 6, 2, 5, 9, 6 followed by the "MENU" key.
- By short-circuiting the SDM pin on the μ P panel.

In the SDM the following information is displayed on the screen:

```
-----
F19DBC X.Y_12345 (1) LLLL (2) SDM (3)
ERR 02 01 14 ## ## ## ## ## ## ##
-----
```

Explanation notes/references:

- (1) Software identification of the main micro controller (F19DBC X.Y_12345)
 - F19D is the chassis name for FTV1.9 display
 - B is the region identification
 - C is the language cluster
 - X = (main version number)
 - Y = (subversion number)
 - ##### are 5 digits of the serial number
- (2) "LLLL" Normal display operation in hours
- (3) "SDM" To indicate that the TV set is in the service default mode
- (4) "ERR 02 01 14 ## ## ## ## ## ## ##" This line shows the contents of the error buffer (max. 10 errors). The last error that occurred is displayed at the most left position. When less than 10 errors have occurred the rest of the line is empty. When the errorlist is empty "No errors" is displayed. No duplicate errors.

Exit the SDM:

Push the "STANDBY" button on the Remote Control.

The SDM sets the following pre-defined conditions:

- Volume level is set to 25% (of the maximum volume level).
- Linear Audio and Video settings are set to 50%.
- Colour temperature is set to normal.

The following functions are "overruled" in SDM since they interfere with diagnosing/repairing a set

- Video blanking.
- Slow demute.
- Anti-ageing.
- Automatic switch to "Standby" when H- and/or V-sync signals are lost.

All other controls operate normally.

5.3.2 Service Alignment Mode (SAM)

The purpose of the SAM is to align and or adjust settings.

For recognition of the SAM, "SAM" is displayed at the top of the right side of the screen

Entering the SAM-menu:

- By pressing the "ALIGN" button on the RC7150 Dealer Service
- Standard RC sequence 062596 followed by the "OSD" button.

- By short-circuiting the SAM pin on the μ P panel (Caution: override of software protections !!)

In the SAM the following information is displayed on the screen:

```
-----
F19DBC X.Y_12345      SAM
ERROR## ## ## ## ##
WHITE POINT
PDP TEST PATTERN      [ON/OFF]
STORE
RESET ERROR BUFFER
-----
```

The menus and submenus

White point

The white point sub menu contains the following items:

- RED
- GREEN
- BLUE
- COLOUR TEMPERATURE

PDP Test pattern

By selecting this item, all OSD disappears from the screen. The screen now changes from light grey to dark grey in a slow regular rhythm. One can so easily check if all pixels of the monitor are correct.

Store

The change values are stored in the NVM.

Reset Error Buffer

This option will reset the error buffer.

Exit the SAM:

Push the "STANDBY" button on the Remote Control.

SAM menu control:

Menu items can be selected with the "UP" or "DOWN" key.

Entry into the selected items (sub menus) is done by the "LEFT" or "RIGHT" key. The selected item will be highlighted.

With the same "LEFT/RIGHT" keys, it is possible to increase/decrease the value of the selected item.

Return to the former screen by pushing the "MENU" button.

The item values are stored in NVM if the sub menu is left.

5.3.3 Customer Service Mode (CSM) Display

FTV1.9 monitors are equipped with the "Customer Service Mode" (CSM). CSM is a special service mode that can be activated and de-activated by the customer, upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Entering the Customer Service Mode.

- By pressing on RC03333/01 the following sequence : Picture, sound, cursor up, cursor down, cursor left, cursor right followed by the "MUTE" button.

Exit the Customer Service Mode.

- pressing the "MENU" or any key on the Remote Control handset (except "P+" or "P-")
- switching off the TV set with the mains switch.

All settings that were changed at activation of CSM are set back to the initial values

The Customer Service Mode information screen

The following information is displayed on screen:

```
-----
CUSTOMER SERVICE MENU
• Software version F19DBC X.Y_####
• Code 1: contains the last 5 error codes
```

- Code 2: contains the first 5 error codes with the last received error at the most left-hand side.
- Service unfriendly modes

5.4 Error code buffer and error-codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right.

In case of non-intermittent faults, clear the error buffer before starting the repair to prevent that "old" error codes are present. If possible check the entire content of the error buffers. In some situations an error code is only the RESULT of another error code (and not the actual cause).

Note: a fault in the protection detection circuitry can also lead to a protection

The error code buffer will be cleared in the following cases:

- exiting SDM or SAM with the "Standby" command on the remote control
- transmitting the commands "DIAGNOSE-9-9-OK" with the DST.

Leaving SDM or SAM with the mains switch does not reset the error buffer.

Examples:

ERROR: 0 0 0 0 0 : No errors detected

ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error

ERROR: 5 6 0 0 0 : Error code 6 was first detected and error code 5 is the last detected (newest) error

Error -nr	Type of Error	Possible defect/cause
1	+5V	+5V pin at μ P is low.
2	8V6	8V6 pin at μ P is low.
3	Fan_prot	Gives an indication that 1 or more FAN(s) does not function, or that 1 or more fan control circuits is defect
4	Over-temp_prot	Temperature at the heatsink of the VsVa supply or the Preconditioner is too high
5	DC_prot	Audio-amplifier IC, its supply or the Audio amplifier is defect
6	Over_voltage_prot	Vs or Va supply voltage is too high
7	Vrr	Powersupply of the display is not correct. Ignorance of the signal during startup by the software.
8	Power_OKE	Power supply or modules that uses this voltage. If this signal is NOT activated means that all supply voltages are available (exception Audio supply)
9	Blocked NVM IIC bus	NVM IIC bus is not correct
10	Blocked slow IIC bus	Slow IIC bus is not correct
11	TDA9860	No acknowledge of Audio controller
12	TDA4885	No acknowledge of Video controller
13	MC141585	No acknowledge of OSD Generator
14	uPD93687 GD-LBD	No acknowledge of Limesco

Error-nr	Type of Error	Possible defect/cause
15	PCF8574 AT	No acknowledge of I/O Expander
16	NVM	No acknowledge of NVM
17	Communication	Fault in the communication

5.5 The "blinking LED" procedure

The contents of the error buffer can also be made visible through the "blinking LED" procedure. This is especially useful when there is no picture. There are two methods:

- When the SDM is entered, the LED will blink the contents of the error-buffer. Error-codes = 10 are shown as followed. A long blink of 1 second which is an indication of the decimal digit, followed by a pause, followed by n short blinks. When all the error-codes are displayed, the sequence is finished with a led display of about 3 seconds. The sequence starts again.
- With the DST all error codes in the error buffer can be made visible. Transmit the command: "DIAGNOSE x OK" where x is the position in the error buffer to be made visible x ranges from 1, (the last (actual) error) to 10 (the first error). The LED will operate in the same way as in the previous point, but now for the error code on position x.

Example:

Error code position 1 2 3 4 5

Error buffer: 12 9 5 0 0

- after entering SDM: 1 long blink of 1 sec. + 2 short blinks - pause - 9 short blinks - pause - 5 short blinks - pause - long blink of 3 sec. --etc.
- after transmitting "DIAGNOSE- 1- OK" with the DST: 1 long blink 2 short blinks - pause - 1 long blink + 2 short blinks - etc.
- after transmitting "DIAGNOSE- 2- OK" with the DST: blink (9x) - pause - blink (9x) - etc.
- after transmitting "DIAGNOSE- 3- OK" with the DST: blink (5x) - pause - blink (5x) - etc.
- after transmitting "DIAGNOSE- 4- OK" with the DST: nothing happens

5.6 Protection structure

5.6.1 General

The protection structure of the FTV1.9 D-box is shown at figure 5.5.

The FTV1.9 monitor has one microprocessor, which is situated on the AV-control panel and is supplied by the 5V standby supply. The microprocessor is even active when the set is switched to standby. The microprocessor controls the "supply-on" line which switches first relay 5680 and then relay 5690. In de standby-mode or the protection-mode the "supply-on" line is "low" and both relays are switched off. The preconditioner is disconnected from the mains.

The protections of the FTV1.9 monitor can be divided into 5 subgroups:

- Fan_prot
- Over_temp_prot
- DC_prot
- Over_voltage_prot
- Vrr

For the Fan-, Over_temp, DC and the Over_voltage protections the signals for the μP are latching, using the 5Vstby-switched for powering the circuits permanently. The μP has sufficient time for diagnosis and for storing the error-codes in the NVM. Vrr, which is an indication of the powersupply of the display is correct, is directly fed to the μP .

5.6.2 Signal line "PROTECTION STATUS" and errorcodes

When one of the protection mechanism is triggered, the 5Vstby-switched is connected via a saturated transistor and a pre-defined resistor to signal line "protection status", which is connected to the μP .

Signal line "protection status" is connected to ground via resistor R3378 and 3379. For each separate fault condition mechanism we get a pre-defined voltage at the μP .

This results in the following table

Protection-mode	Series resistor	Voltage at "protection-status" line	Error-code
None	-----	< 0.3V	none
Fan_prot	1K Ω	0.30V < Vprot < 1.90V	3
Vs or Va_prot	470 Ω	1.90V < Vprot < 2.80V	4
Temp_prot	220 Ω	2.80V < Vprot < 3.75V	5
DC-prot	68 Ω	3.75V < Vprot < 4.7V	6
Vrr	-----	-----	7

Protection signal Vrr coming from the PDP, to indicate that the powersupply is ok or not ok ("1" or "0") is directly connected to the μP . Error-code 7 is stored in the NVM and the set is switched to standby.

When one of the protections is activated, the power supplies of the Vs and Va are shut down and the set is switched to standby.

5.6.3 Fan protection

When this protection is activated, the Va- and Vs power supply are shut down. The set is switched to the standby mode and error-code 3 is stored in the NVM.

The fan voltage is powered by 17V, but clamped to 12V to prevent damage. In order to be able to verify whether the fans are running, a fault detection circuit is implemented for each of the 6 fans. A running fan gives pulses in the same speed as the rotation of the blades. The circuit uses these pulses to trigger the discharge of an elcap. The elcap is continuously charged through a resistor.

Example : Capacitor C2319 is charged through R3356 and at every pulse discharged by T7322. When fan 6 is blocked, C2314 is charged via D6326 en triggers thyristor 7315, because C2319 is no longer discharged via T7322. The current now flows from the 5Vstby-switched via resistor 3383 and 3325 driving transistor T7321 into saturation. The voltage dividing of R3323 and resistor R3378 and 3379 now determine the voltage "protection status". (neglect the Vce of 0.2V of T7321.).

Reset of the VsVa-supply.

Transistor T7339 is shorted now by the presence of the "protection status" signal. T7339 connects resistor R3376 and R3389 to ground, switching on T7338. Thyristor 7333 is now triggered, shorting signal PROTS to ground. To follow the signal flow, go to the right upper corner of schematic FD1. Connecting PROTS to ground, will start a current flow through opto-coupler diode 7103 and the opto-coupler transistor connects supply voltage Vcc2 to the fault input (pin 10) of IC 7101. When the voltage at pin 10 exceeds 1.0V, IC7101 stops oscillating. The Va-supply stops functioning.

To continue the signal flow, go to the right upper corner of schematic FD2. Connecting PROTS to ground also results in a current flow through the opto-coupler diode of 7003. The opto-coupler transistor connects supply voltage Vcc1 to the fault input (pin 10) of IC 7001. When the voltage at pin 10 exceeds 1.0V, IC7001 stops oscillating. The Vs-supply stops functioning.

5.6.4 Vs and Va protection

Va protection

When this protection is activated, the Va- and Vs power supply are shut down. The set is switched to the standby mode and error-code 4 is stored in the NVM.

When the Va-supply exceeds the 68V, regulator 7112 is triggered and will switch on T7113. Capacitor 2132 is charged via the 5Vstby-switched and will trigger thyristor 7114, which will switch on T7341. The voltage dividing of R3386 and resistor R3378 and 3379 now determine the voltage "protection status". (neglect the Vce of 0.2V of T7341). See schematic FD2.

The presence of the voltage at "protection status" line will eventually reset the VsVa-supply. For more info see subparagraph - Reset of the VsVa-supply.

Vs protection

When this protection is activated, the Vs power supply is shut down. The set is switched to the standby mode and error-code 4 is stored in the NVM.

When the Vs supply exceeds the 198V, regulator 7012 is triggered and will switch on T7016. Capacitor 2032 is charged via the 5Vstby-switched and will trigger thyristor 7013. Thyristor 7013 is fired and connects signal Aa to ground. To follow the signal flow, go to the right upper corner of schematic FD1. When signal Aa is shorted to ground, T7341 is switched on. The voltage dividing of R3386 and resistor R3378 and 3379 now determine the voltage "protection status". (neglect the Vce of 0.2V of T7341). See schematic FD2.

The presence of the voltage at "protection status" line will eventually reset the VsVa-supply. For more info see subparagraph - Reset of the VsVa-supply.

5.6.5 Temperature Protection

When this protection is activated, the Va- and Vs power supply are shut down. The set is switched to the standby mode and error-code 5 is stored in the NVM.

When the temperature of the heatsink on the Preconditioner panel or on one of the 2 heatsink on the VsVa panel exceeds the 110°C, the PTC resistance increases drastically. The voltage at pin 3 of IC7330 will drop and the output of 7330 will do the same. The current flow through opto-coupler diode 7331 results also in a current flow through the opto-coupler transistor and will trigger thyristor 7332. The fired thyristor switches transistor 7337 on. The voltage dividing of R3339 and resistor R3378 and 3379 now determine the voltage "protection status". (neglect the Vce of 0.2V of T7337).

The presence of the voltage at "protection status" line will eventually reset the VsVa-supply. For more info see subparagraph - Reset of the VsVa-supply.

5.6.6 DC Protection - Audio Amplifier

When this protection is activated, the Va- and Vs power supply are shut down. The set is switched to the standby mode and error-code 6 is stored in the NVM.

In case of a fault in the Audio amplifier or when a DC voltage appears on the speaker output, a signal called DCProt is generated. See schematic FD2 - F7. In case of a fault, thyristor 7314 is triggered and switches on T7340. The voltage dividing of R3380 and resistor R3378 and 3379 now determine the voltage "protection status". (neglect the Vce of 0.2V of T7340).

The presence of the voltage at "protection status" line will eventually reset the VsVa-supply. For more info see subparagraph - Reset of the VsVa-supply.

5.6.7 Vrr - PDP supplies

Vrr is a logical signal ("high" in normal circumstances) that comes from the PDP. Its purpose is to trigger the switch-off of the Pre-conditioner supply in case Vrr becomes "low", to trigger the shutdown of the VsVa supply and to initialise that error-code 7 is stored in the NVM.

When signal Vrr becomes "low", see FD1 - section F13, the output of IC7301-B becomes "high". This results in two actions. It will trigger thyristor 7302 and short signal PROTS to ground. This results eventually in a reset of the VsVa supply. Switching on T7371, which again switches on T7370 via the 5Vstby-switched supply. Signal-line "supply-on" is now grounded. This results in switching off relay 5680 and 5690, disconnecting the mains from the pre-conditioner. The standby supply (5Vstby-switched) is still functional. (See Fig. 5-5)

5.7 Fault finding tips

5.7.1 Pre-conditioner

The Pre-conditioner delivers the following output voltages:

- 5 VSTBY
- 5 VSTBY_switched
- 380 VDC
- Internal 12 VSTBY to supply the relay, which switches the mains input

To trouble shoot the pre-conditioner, first check the LED of the display-box.

- No red, green or orange LED indicates the absence of the +5Vstby_switched at the VsVa panel.

Check the +5Vstby_switched on pin 5 of connector PR08. If this voltage is present check the presence of this voltage at the VsVa-panel on pin 2 of connector FD04. See the wiring diagram of the monitor for more details.

If the voltage is not present, check R3508 and fuse 1500. In case of a defective R3508, check/replace item 7500, opto-coupler 7501, regulator 7502, and diode 6501 + 6502. In case of an open circuit of fuse 1500, check/replace bridge 6500 and capacitor C2501.

If both component are alive, measure the voltage at pin 5 of IC7500 - Topswitch. If the waveforms resemble a burst-signal, the output is too heavy loaded. Check the output diode D6504 and capacitor C2508 of the 12VSB and diode 6505 and capacitor C2510 of the 5VSTBY.

- The red LED is blinking (+5Vstby is OK!), which is an indication of a protection.

Disconnect the VGA-cable between the E-box and the Monitor. Now the Monitor is operating as a stand-alone unit.

Switch the monitor via the DST, (command "Default") or via the RC (special sequence) to the SDM.

Automatically the orange coloured LED of the monitor will blink the content of the error-buffer. If the sequence contains error-code 8, the cause could be a defective pre-conditioner. Error-code 8 is an indication that the +5V and/or the Vs/Va of the VsVa supply are not correct.

In case of error-code 4, switch OFF the set and check the temperature of the heatsink. In case of a high temperature of the heatsink, check MOSFET T7610 and the drive-circuit around T7640, T7641 and T7608.

In case of error-code 8, remove connector PR09 from the board. Short-circuit pin 2 of T7681 to ground, simulation of "SUPPLY_ON". (Caution - Protections overruled!!!)

Measure voltage at C2616. Is voltage 380Vdc?

Yes, the cause was a too heavy load/short-circuit at the VsVa-panel.

No, measure the voltage at C2606/C2607. Is this voltage a DC-voltage of approx. 300V with a strong ripple at a mains-input of 230Vac? If NO, check if relay 5690 is activated via the transistors T7684 + T7690. Check also PTC's 3600, 3601 and 3602 at their resistor-value.

Voltage is present at C2606. Check/replace NFR 3663 and 3668, if one of them is an open-circuit. In case R3663 is an open circuit, check/replace diode 6660, 6661 and capacitor C2664 plus IC 7660. If IC7660 is defect, check/replace IC 7650 and C2262. In case of an open circuit of NFR 3668, replace IC 7650.

NFR 3663 and NFR 3668 are not defect. Measure waveform at base of T7608. Is a square waveform present at gate of T7610? Check/replace MOSFET T7610 and the drive-circuit around T7640, T7641 and T7608.

5.7.2 VsVa-supply

The red LED is blinking (+5Vstby is OK!), which is an indication of a protection.

Disconnect the VGA-cable between the E-box and the Monitor. The Monitor is now operating as a stand-alone unit.

Switch the monitor via the DST, (command "Default") or via the RC (special sequence) to the SDM.

- Error-code 1, check the +5V supply
Check fuse 1103. If the fuse is an open circuit, check/replace IC 7201. If fuse 1103 is OK, check the presence of the 17V. If this voltage is not present check fuse 1102 + 1104 and D6121 + D6122. If the 17V is present, then remove connector FD05. The reason could be a too heavy load or a short-circuit of the +5V supply. If after disconnection of connector FD05 the set still goes into protection, check D6203, NFR 3205 and the circuit around IC 7201.

- Error-code 2, check the 8V6 supply
Check regulator IC 7203, NFR 3099 and D6204.

- Error-code 8 there is something wrong with the POWER_OKE signal. When the POWER_OKE signal is low, the Vs and Va and the +5V are available.

Measure the voltage Va at C2120. Is the voltage between 55V and 65V? If not check fuse 1105 and D6120. If both components are OK, the cause could be a too heavy load. Measure the voltage Vs at C2020. Is the voltage between 165V and 185V? If not check D6020. If D6020 is OK, the cause could be a too heavy load.

If both voltage are not present, check fuse 1004 at the input. If fuse 1004 is an open circuit, check the MOSFET's 7005 and 7006 for a short-circuit. In case of short-circuit use the repair-kit.

If fuse 1004 is OK, check the voltage at pin 15 of IC 7001. Is the voltage at pin 15 approx. 16-17V? If NO, check NFR 3002 and D6002 + D6030. If YES, check the waveforms FD49 and FD50 at pin 14 and 12. If they are present, check pulse transformer 5001 and the driver-circuits around MOSFET 7005 and 7006. If the waveforms FD49 and FD50 are not present, replace IC7001.

- Error-code 5, check the audio-supply or the Audio amplifier IC.

Check/replace fuse 1201 + 1202 and diode 6201 + 6202. If the components are OK, check the audio-amplifier IC.

- Error-code 6, check the Vs and/or the Va supply voltage. The regulation-circuit of one of these voltages is not working correctly.

For the Va supply check opto-coupler 7102 and IC 7110.

For the Vs supply check opto-coupler 7002 and IC 7010

5.8 ComPair

5.8.1 ComPair mode

The monitor, as a stand-alone unit, can be diagnosed via a PC/laptop by using ComPair via the ComPair connector. Before connecting the ComPair-cable at the AV Control panel on connector AVC34, the monitor must be put in the "ComPair - Mode ". This can be done by changing the jumpers at connector AVC39. Connector AVC39 is situated under the uP panel.

The figure below shows how to do it.

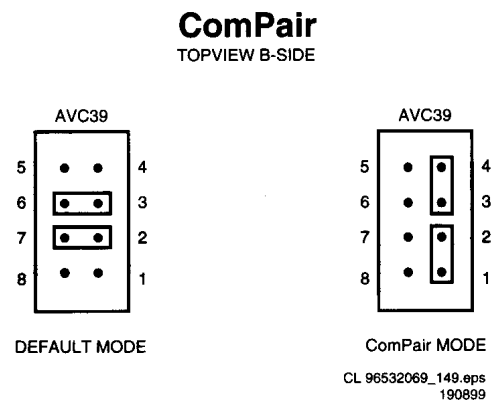


Figure 5-1

After switching ON the set, the red LED will blink as an indication that the monitor is in the ComPair mode.

5.8.2 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding how to repair the FTV1.9 in short time by guiding you step by step through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself; ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the FTV1.9 (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan FTV1.9 electronic manual, schematics and PCBs are only a mouse-click away.

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable. In case of the FTV1.9 chassis, the ComPair interface box and the FTV1.9 communicate via an I2C cable (bi-directional). The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:

1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the FTV1.9.

Automatic information gathering

Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.

Diagnosis on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the FTV1.9.

Manual information gathering

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an

waveform pictures) that will bring you to the next step in the faultfinding process.

A question could be: Do you see snow? (Click on the correct answer)

YES / NO

An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

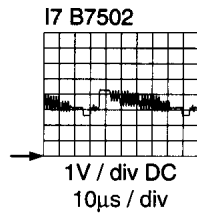


Figure 5-2

By a combination of automatic diagnostics and an interactive question/answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Additional features

Beside fault finding, ComPair provides some additional features like:

- Uploading/downloading of pre-sets
- Managing of pre-set lists
- Emulation of the Dealer Service Tool

5.8.3 Searchman (Electronic Service Manual)

If both ComPair and SearchMan are installed, all the schematics and PCB's of the faulty set are available when clicking on the hyper-link of a schematic or a PCB in ComPair. Example : Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier.

Clicking on the PCB hyper-link, automatically shows the PCB with a highlighted capacitor C2568. clicking on the schematic hyper-link, automatically shows the position of a highlighted capacitor C2568 at the schematic.

5.8.4 Connecting the ComPair interface

The ComPair Browser software should be installed and setup before connecting ComPair to the FTV1.9. (See the ComPair Browser Quick Reference Card for installation instructions):

1. Connect the RS232 interface cable to a free serial (COMM) port on the PC and the ComPair interface PC connector (connector marked with "PC").
2. Place the ComPair interface box straight in front of the television with the infrared window (marked "IR") directed to the television LED. The distance between ComPair interface and television should be between 0.3 and 0.6 meter. (Note: make sure that (also) in the service position, the ComPair interface infra red window is pointed to the standby LED of the television set (no objects should block the infra red beam))
3. Connect the mains adapter to the connector marked "POWER 9V DC" on the ComPair interface
4. Switch the ComPair interface OFF
5. Switch the television set OFF with the mains switch
6. Remove the rear cover of the television set
7. Connect the interface cable (4822 727 21641) to the connector on the rear side of the ComPair interface that is marked "I2C" (See Figure 5-4)
8. Connect the other end of the interface cable to the ComPair connector AVC34 (0334) at the right/bottom side of the AV-Control panel.

9. Plug the mains adapter in the mains outlet and switch ON the interface. The green and red LED's light up together. The red LED extinguishes after approx. 1 second (the green LED remains lit).
10. Start-up Compair and select "File" menu, "Open..."; select "FTV1.9 Fault finding" and click "OK"
11. Click on the icon (Fig. 5-3) to switch ON the communication mode (the red LED on the ComPair interface wil light up)
12. Switch on the television set with the mains switch
13. When the set is in standby. Click on "Start-up in ComPair mode from standby" in the ComPair FTV1.9 fault finding tree, otherwise continue.



Figure 5-3

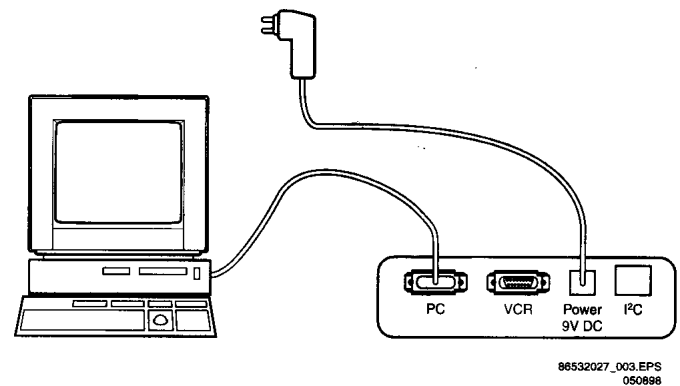


Figure 5-4

The set has now started up in ComPair mode. Follow the instruction in the FTV1.9 fault finding tree to diagnose the set. Note that the OSD works but that the actual user control is disabled

5.8.5 Preset installation

Presets can be installed in 2 ways with the FTV1.9.

- Via infra red
 - only sending TO the television
 - the rearcover does NOT have to be removed

Click on "File" "Open" and select "TV - use ComPair as DST" to use infra red

- Via cable
 - sending TO the television and reading FROM the television
 - the rearcover has to be removed

Click on "File" "Open" and select "FTV1.9 fault finding" to use the cable

Presets can be installed via menu "Tools", "Installation", "Presets".

5.8.6 Ordering ComPair

ComPair order codes:

- Starterkit ComPair + SearchMan software + ComPair interface (excluding transformer): 4822 727 21629
- ComPair interface (excluding transformer): 4822 727 21631
- ComPair transformer (continental) Europe: 4822 727 21632
- ComPair transformer United Kingdom: 4822 727 21633
- Starterkit ComPair software: 4822 727 21634

- Starterkit SearchMan software: 4822 727 21635
- Starterkit ComPair + SearchMan software: 4822 727 21636
- ComPair CD (update): 4822 727 21637

- SearchMan CD (update): 4822 727 21638
- ComPair interface cable (for FTV1.9): 4822 727 21641

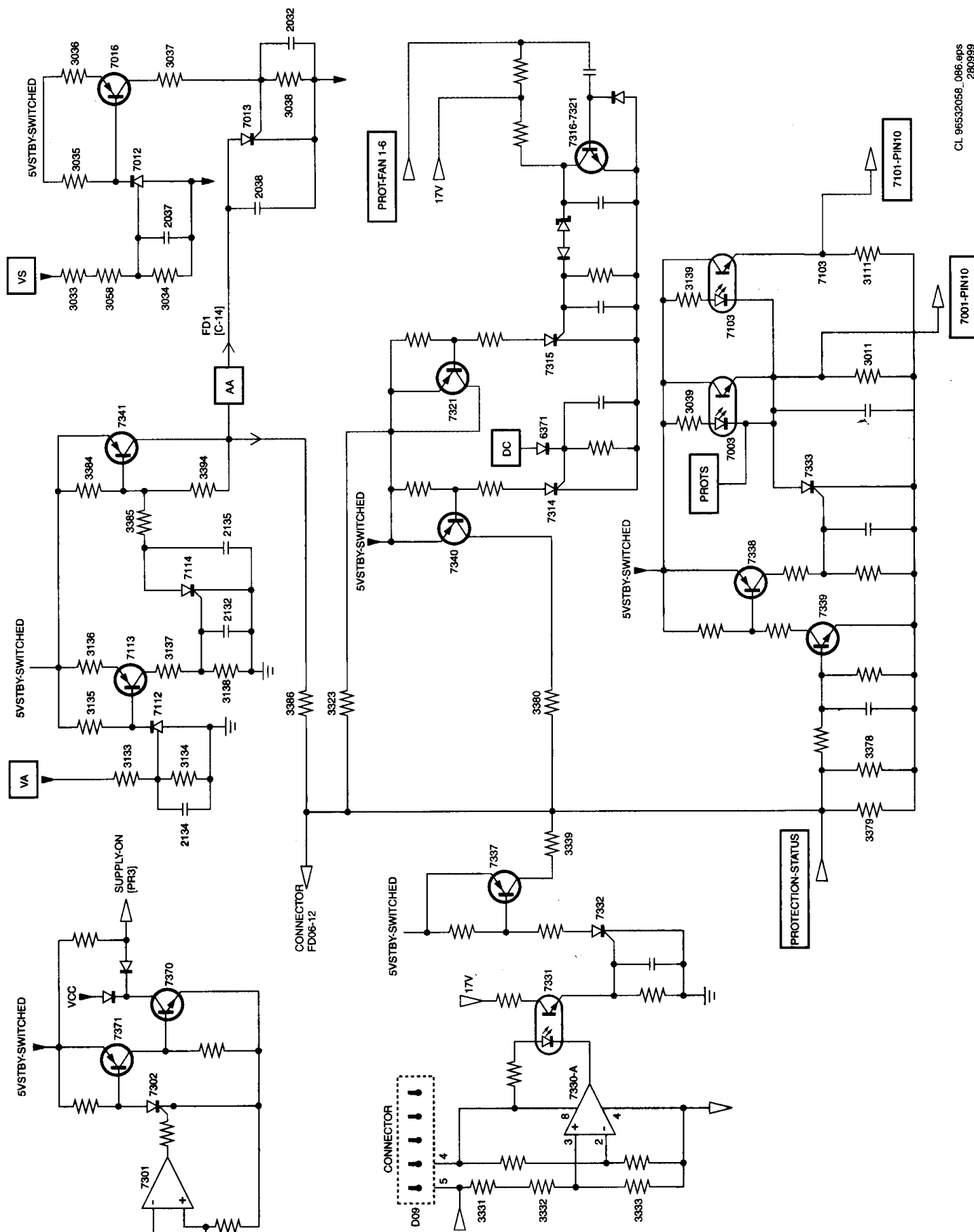
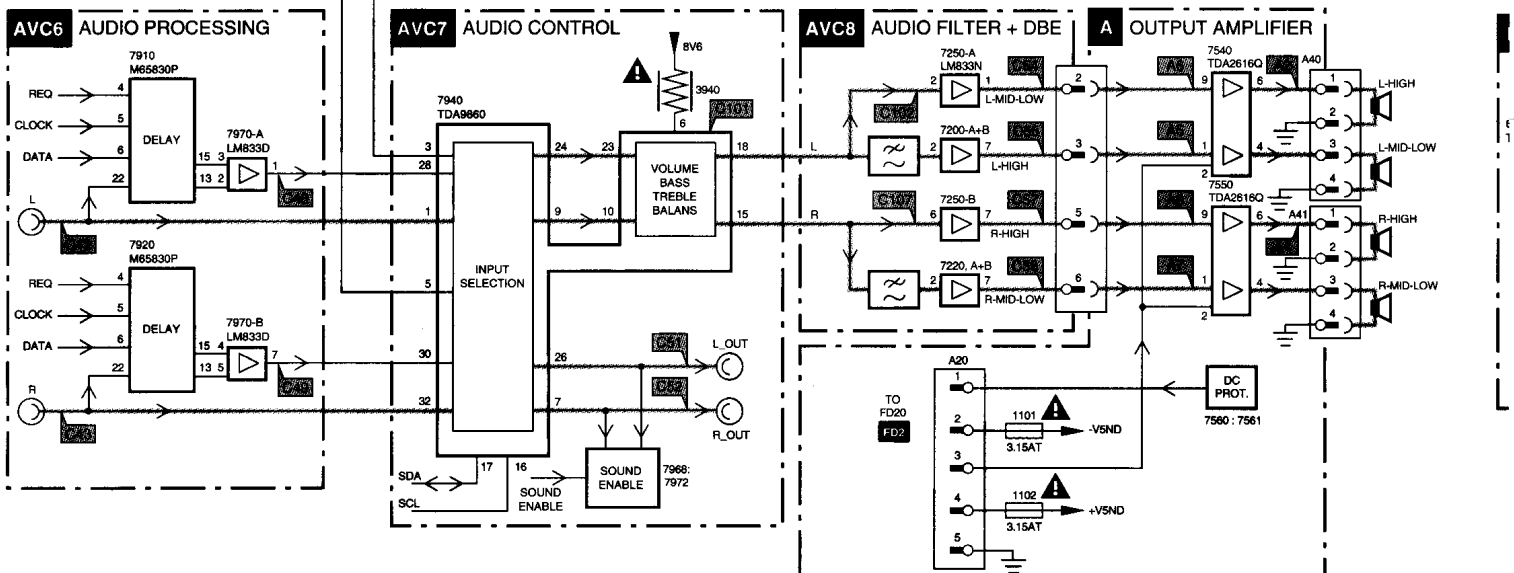
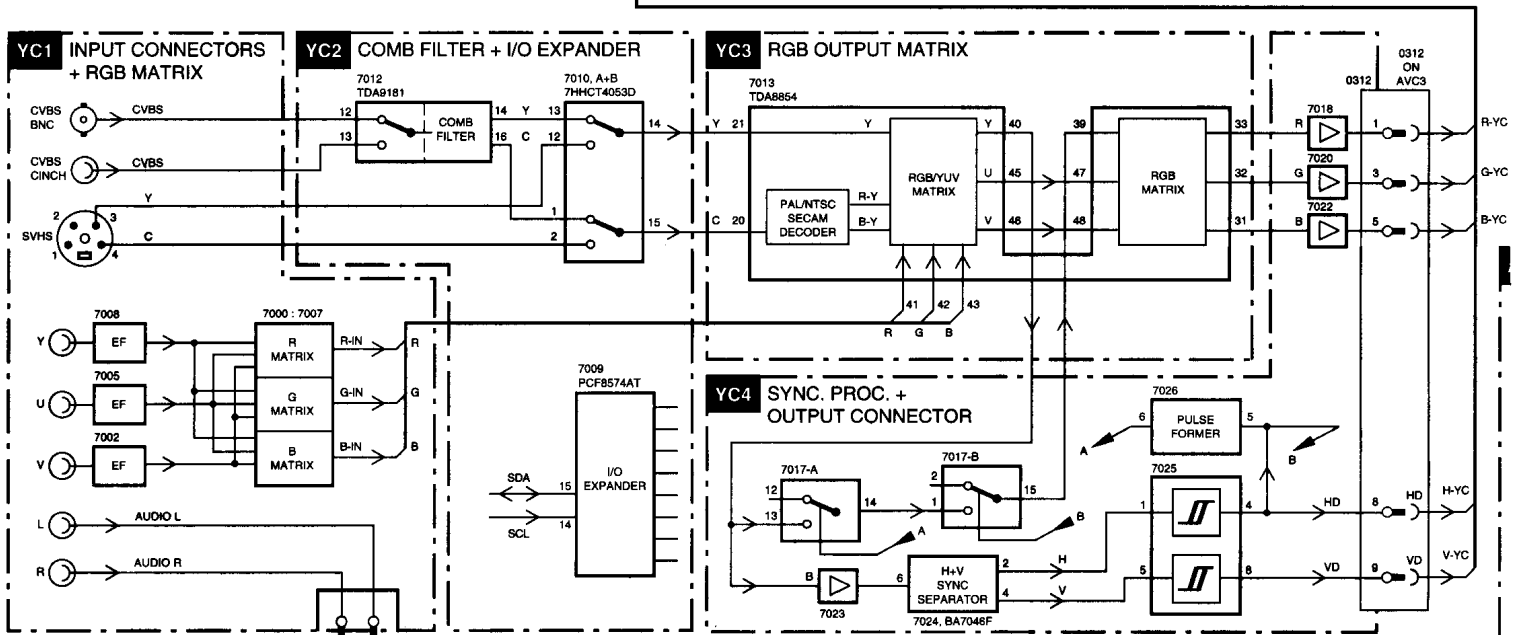
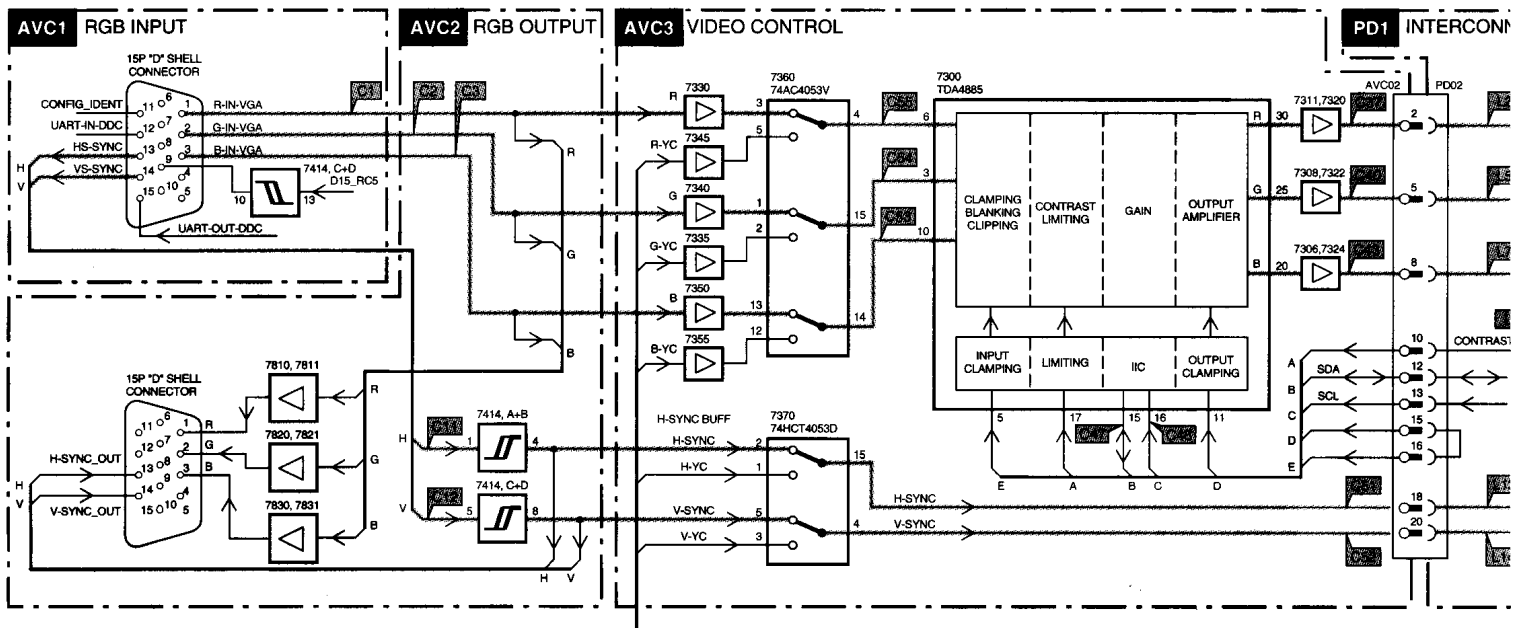
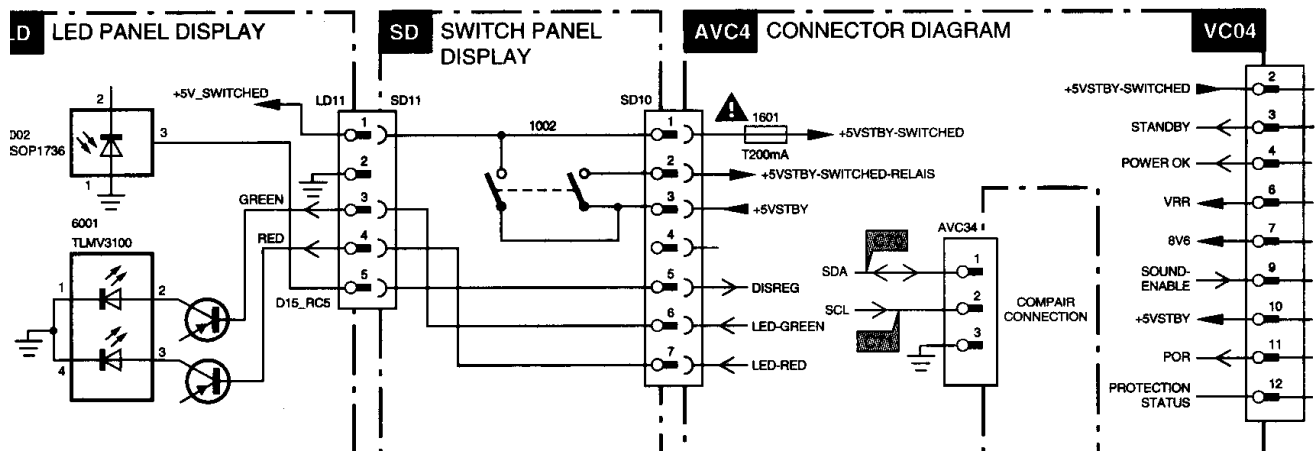
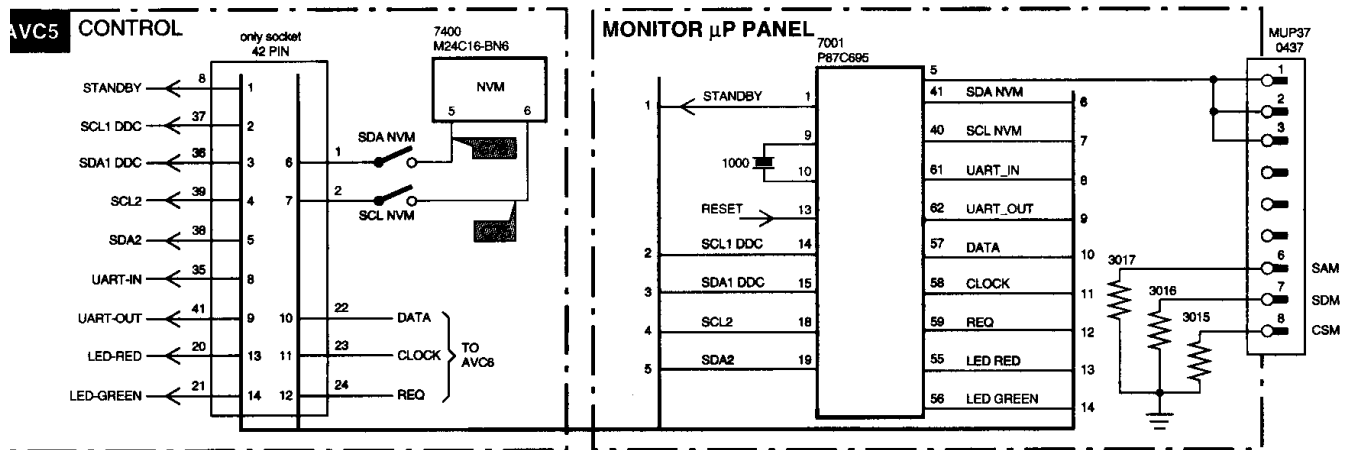
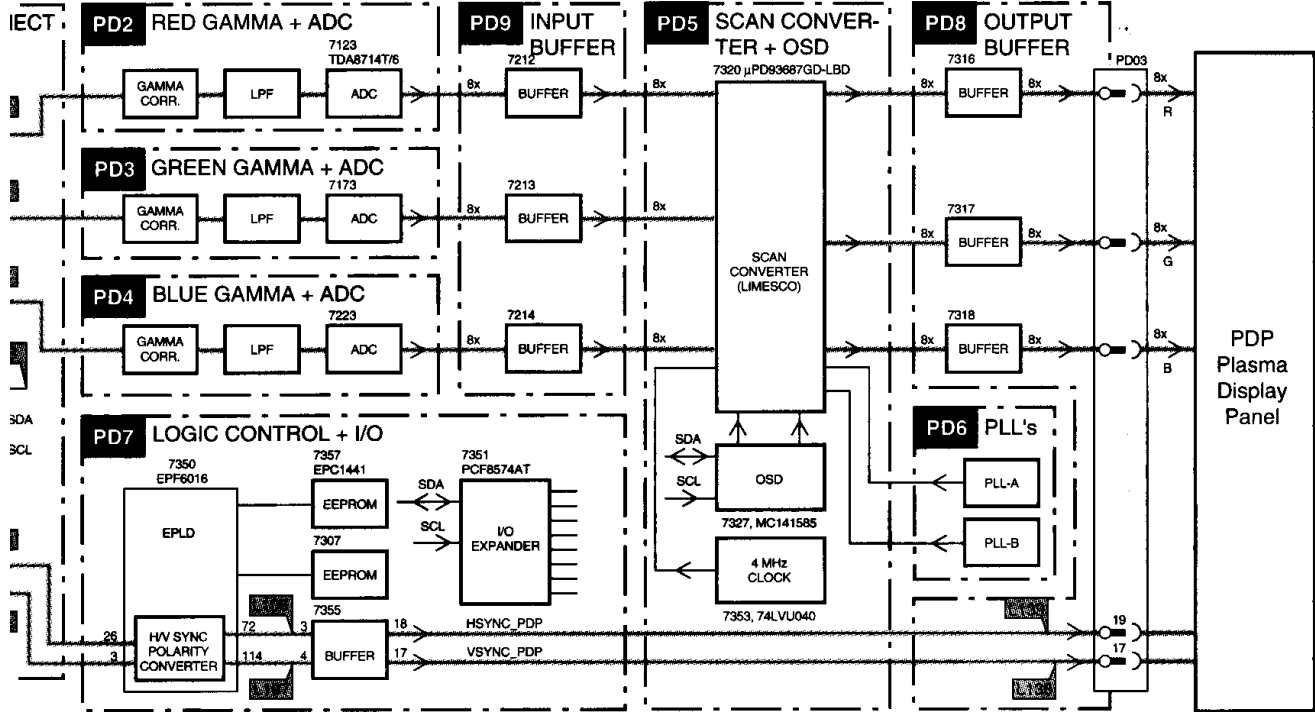


Figure 5-5

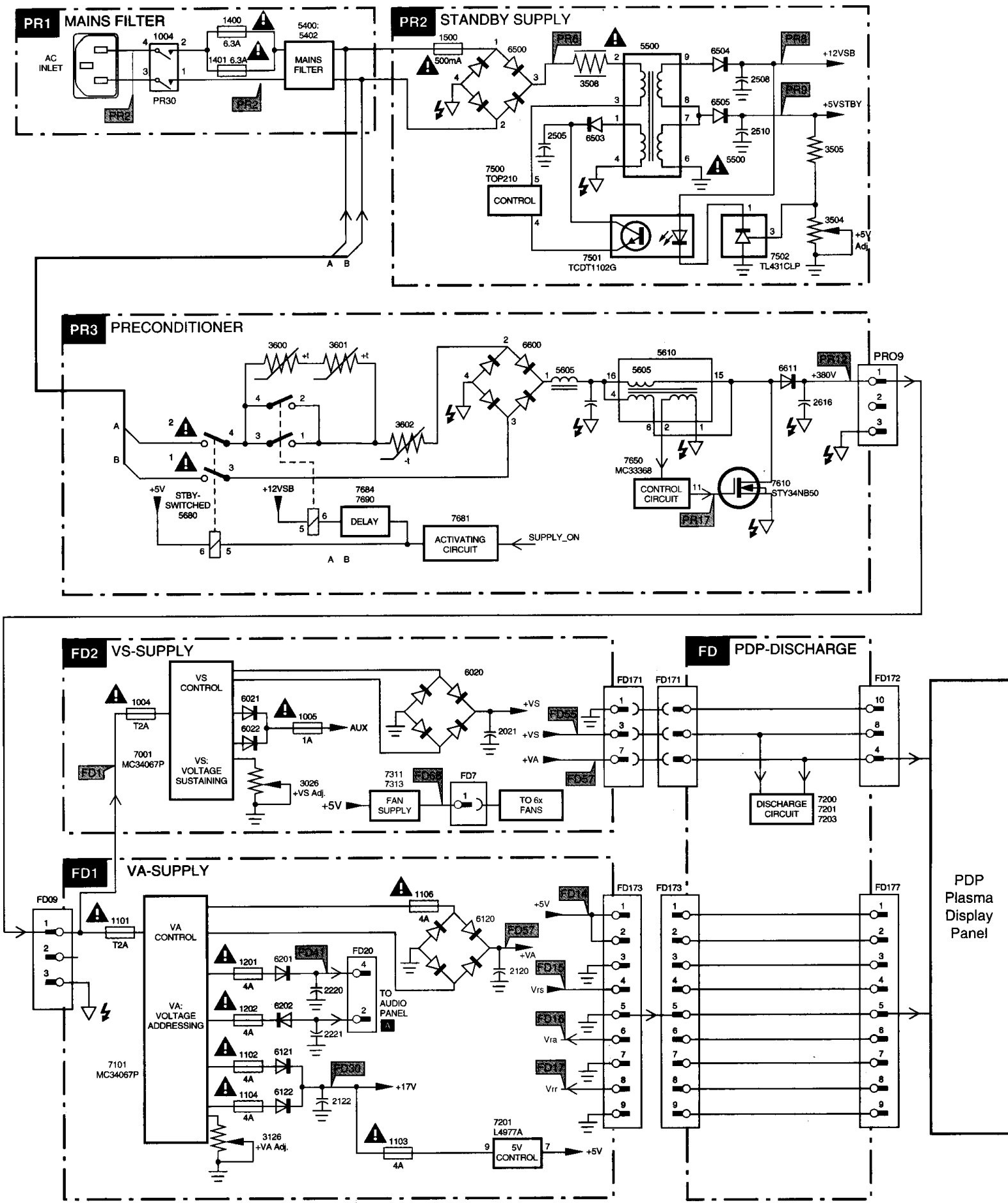
6. Block diagrams

Block diagram (Part 1)

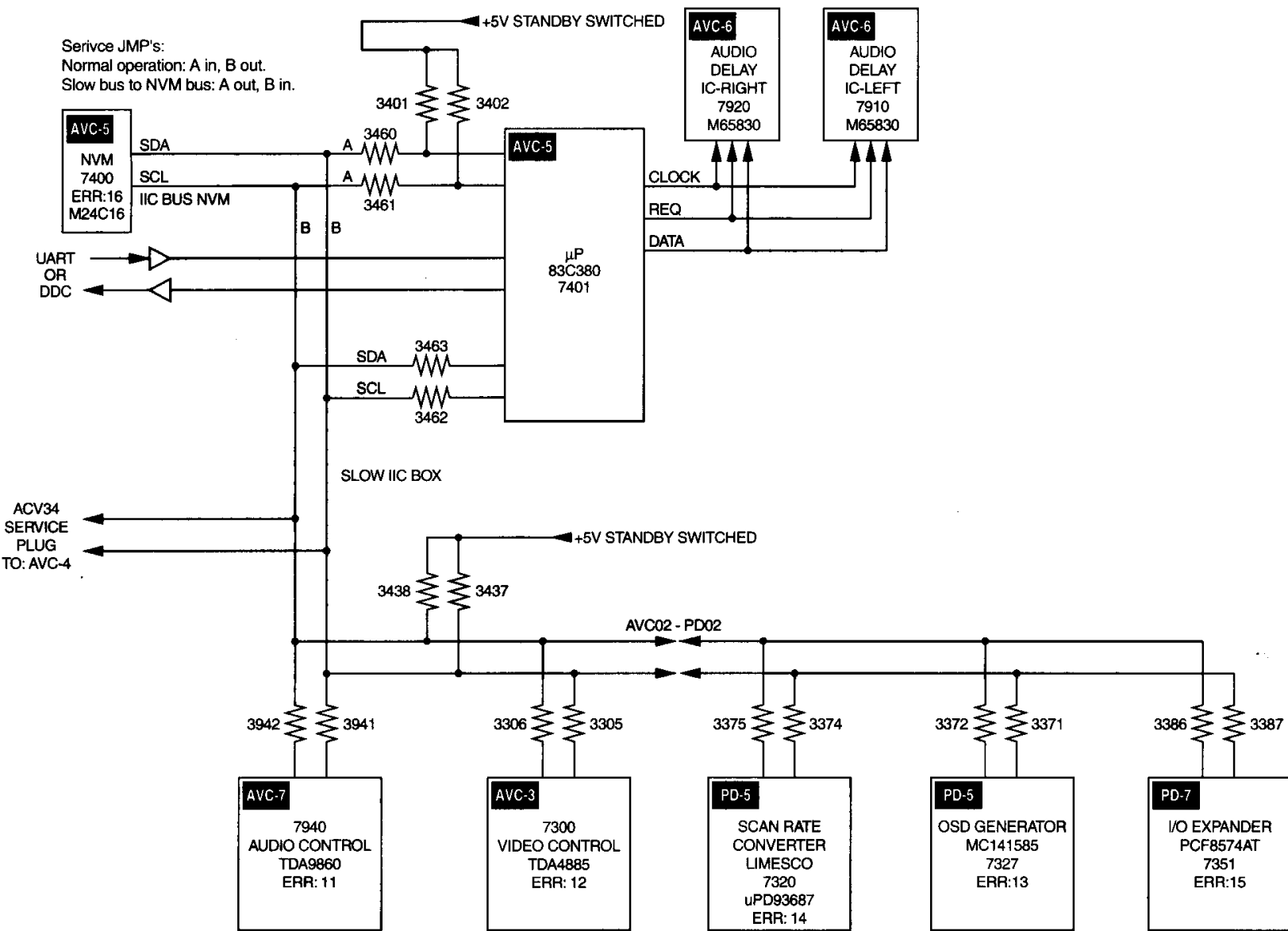




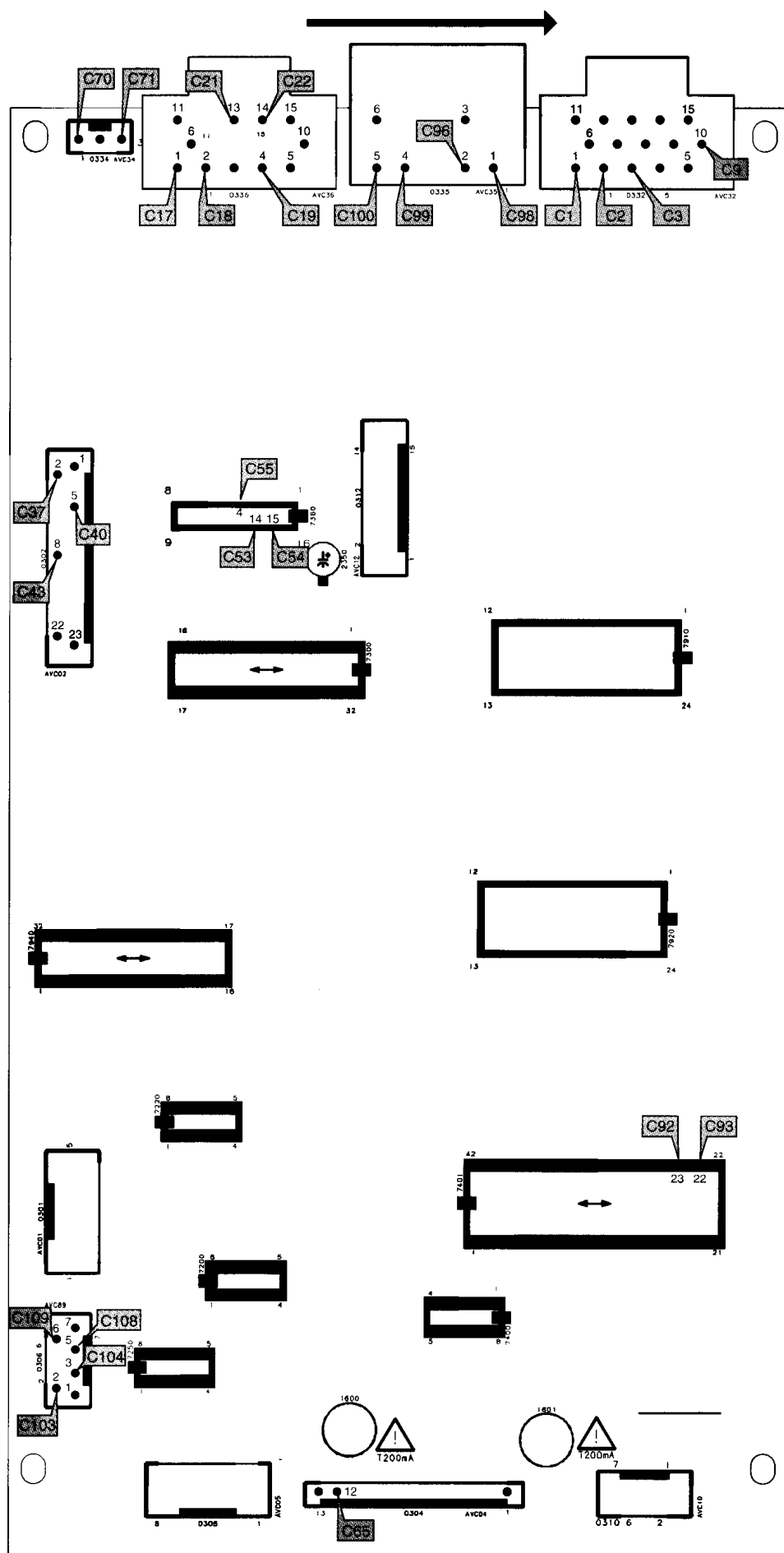
Block diagram (Part 2)

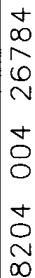


I2C bus interconnection diagram

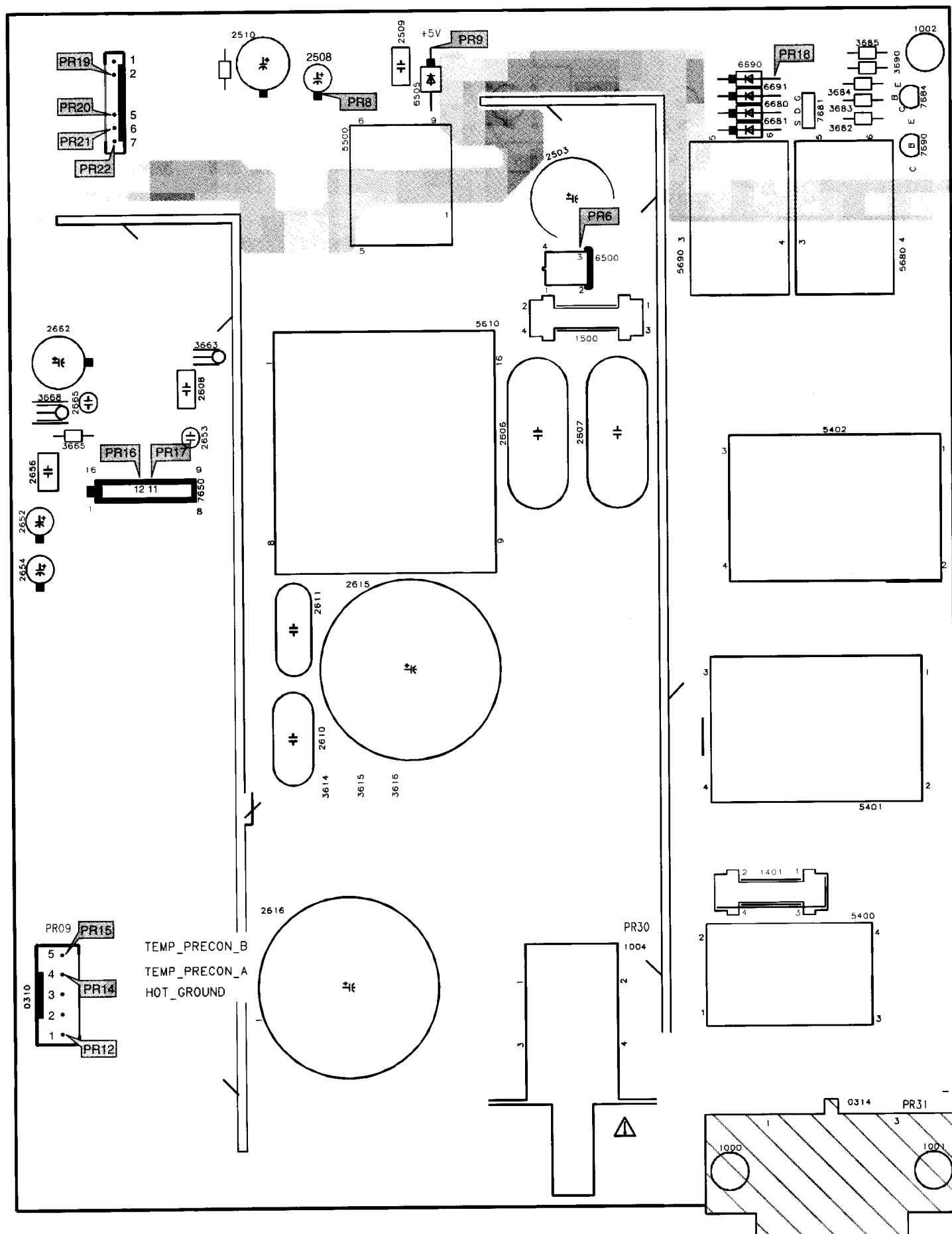


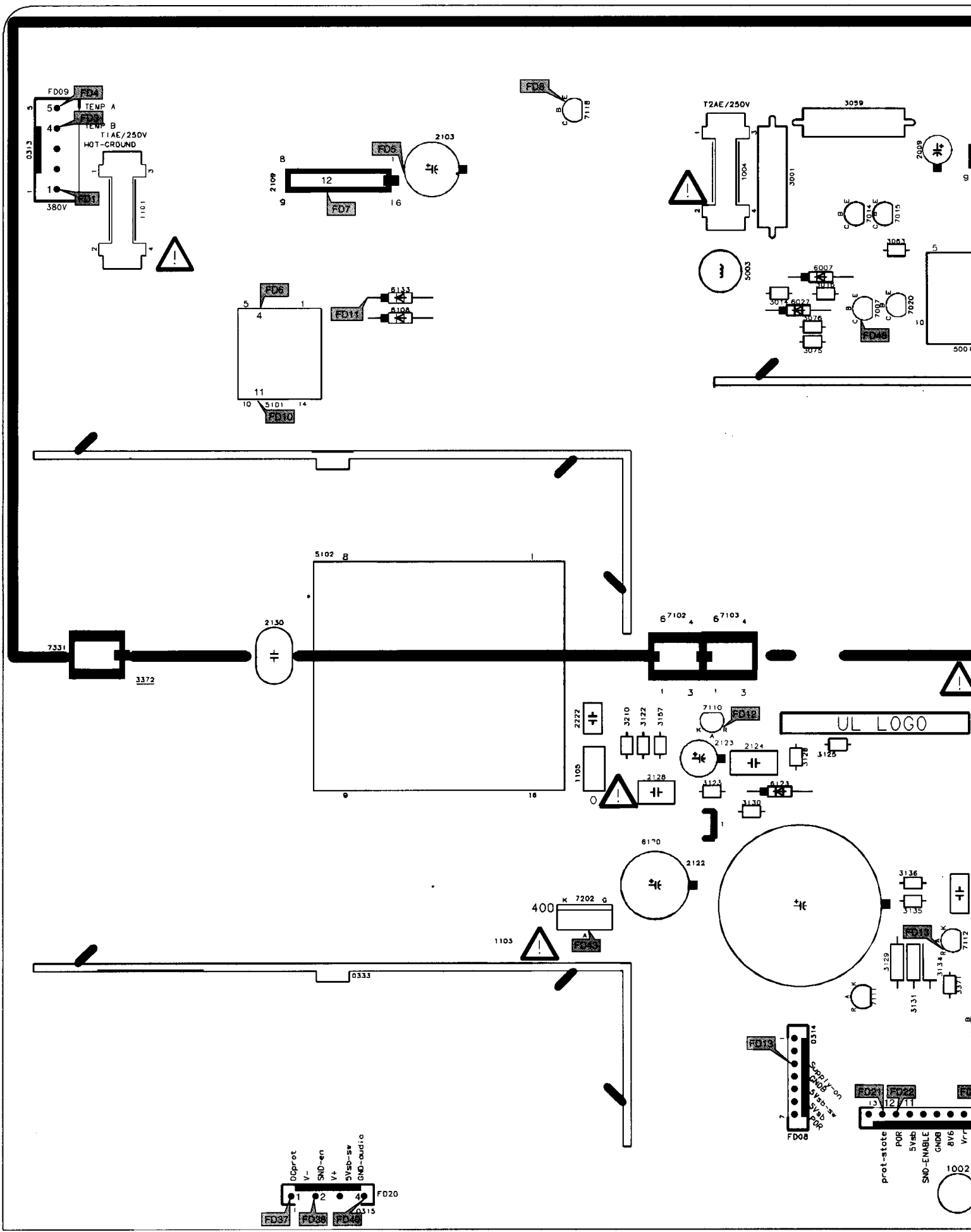
Testpoint overview AV Control

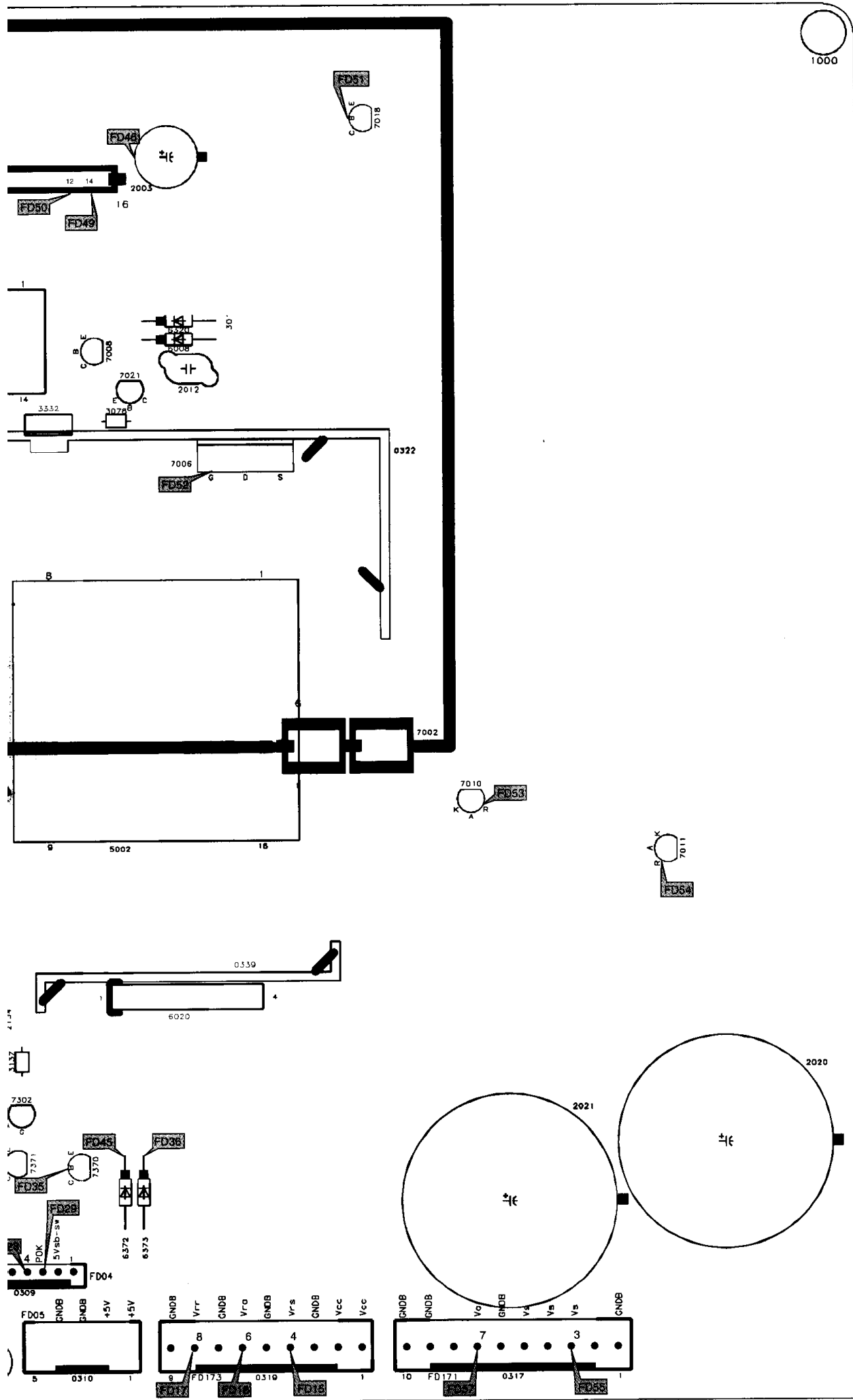




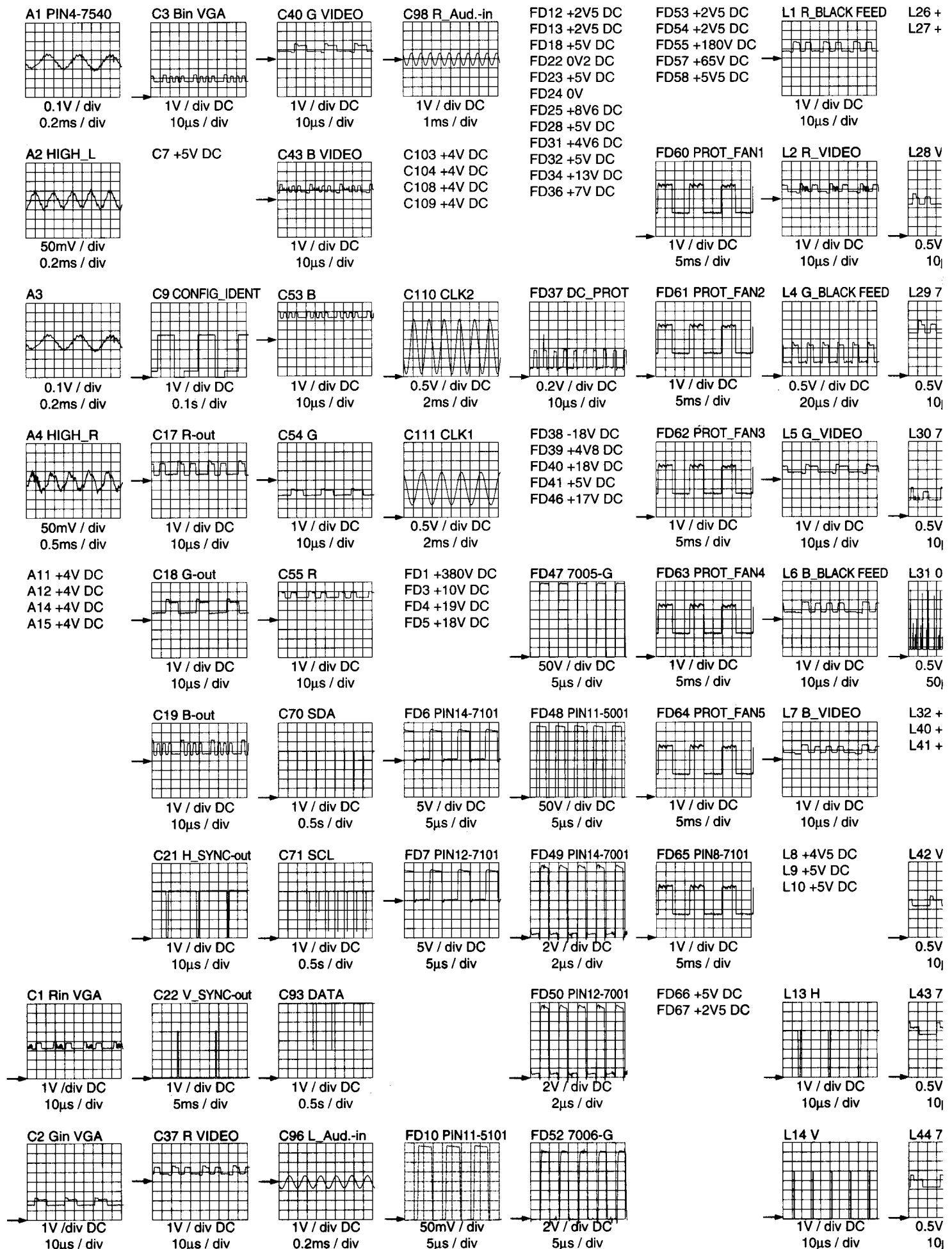
Testpoint overview Preconditioner

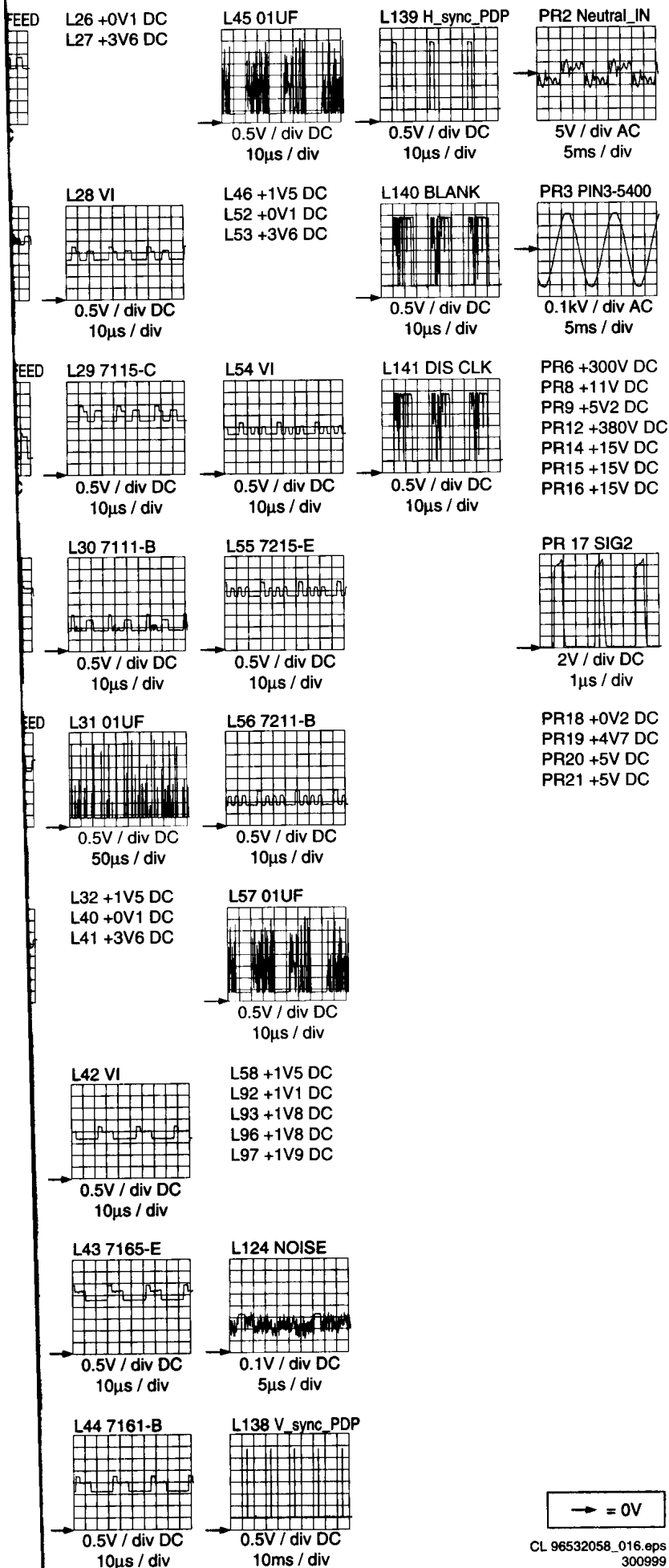




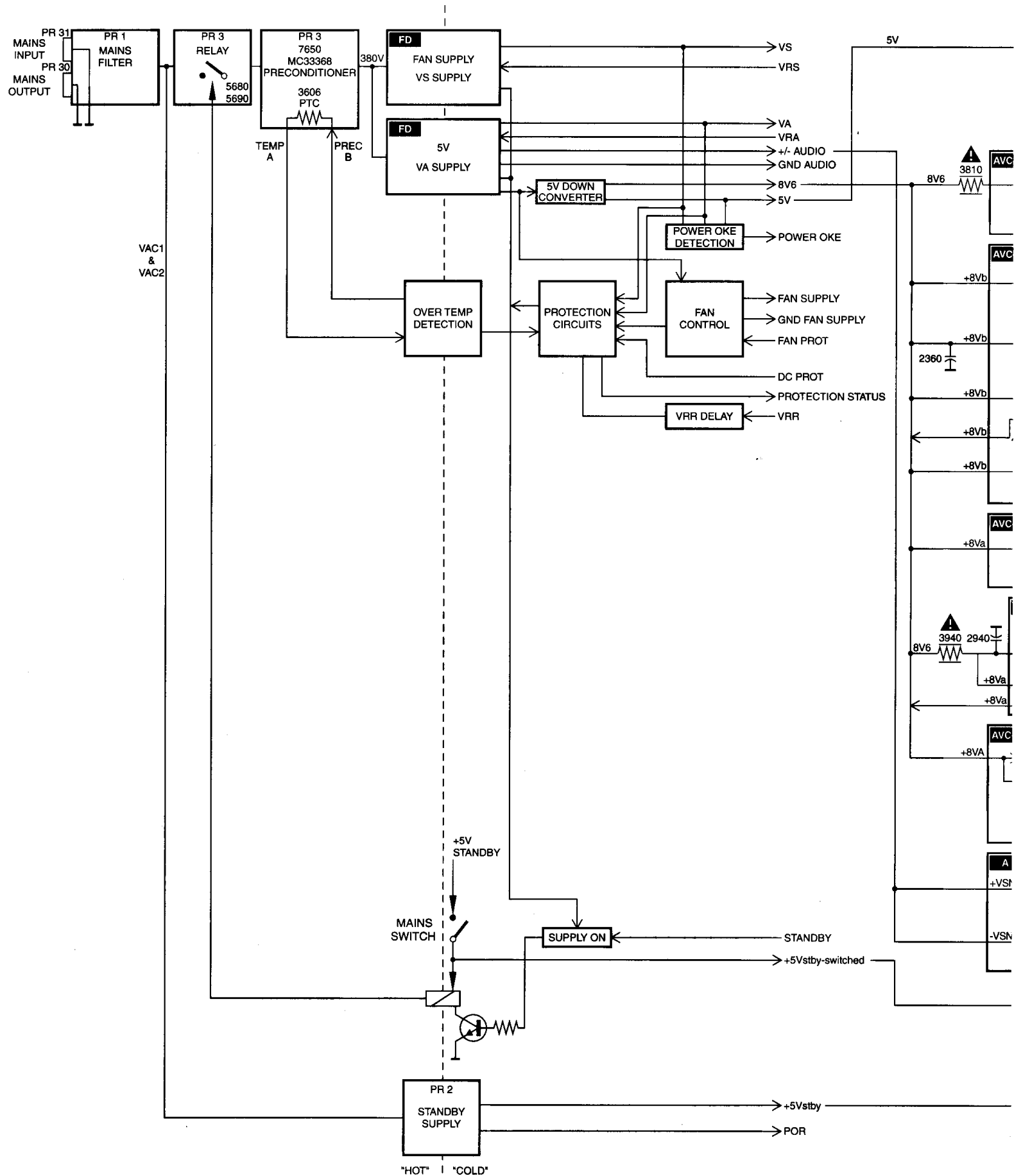


Oscillograms

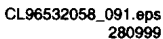




Supply voltage diagram



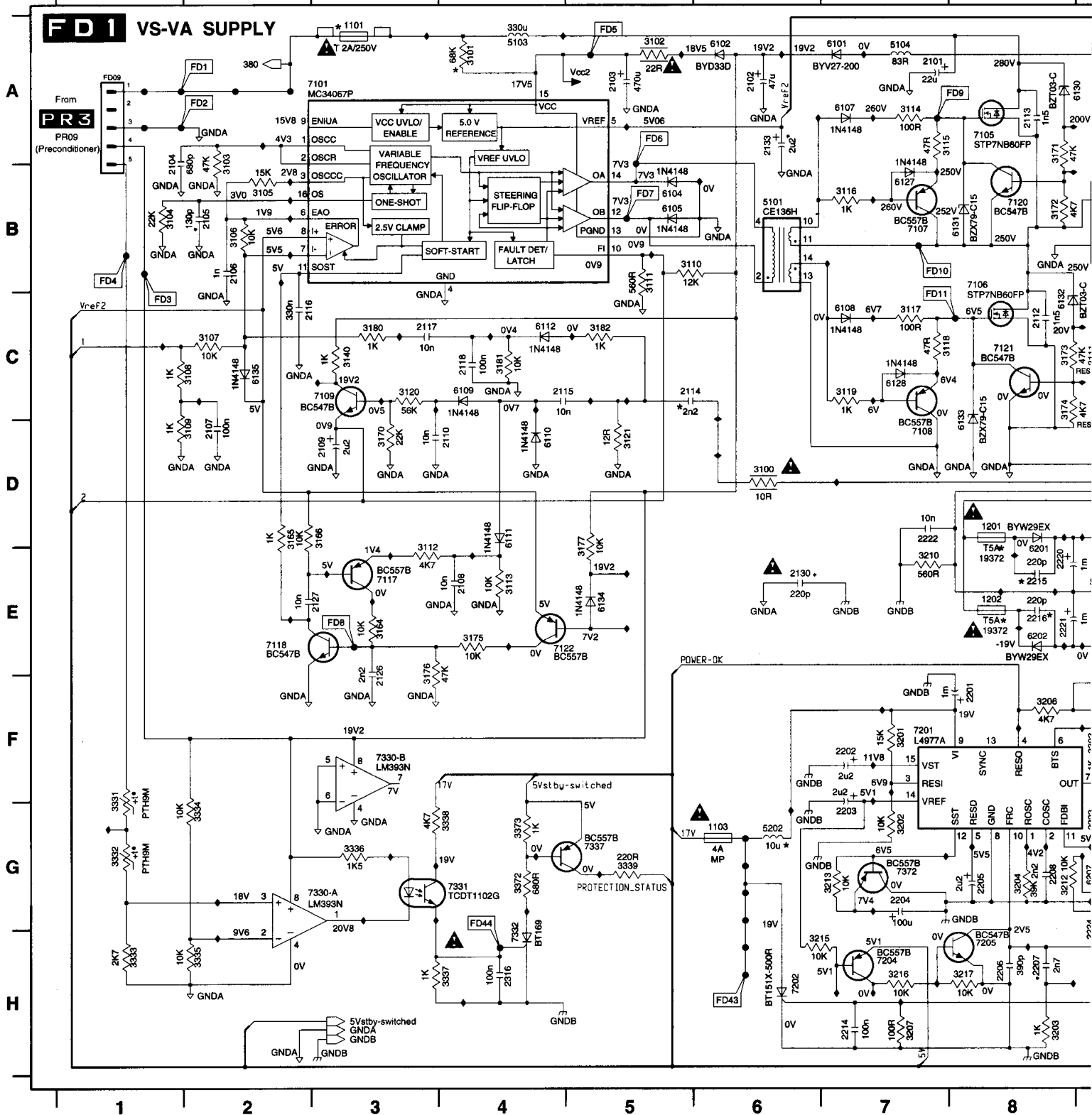
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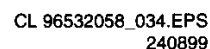


7. Electrical diagrams and print layouts

VsVa supply (FD)

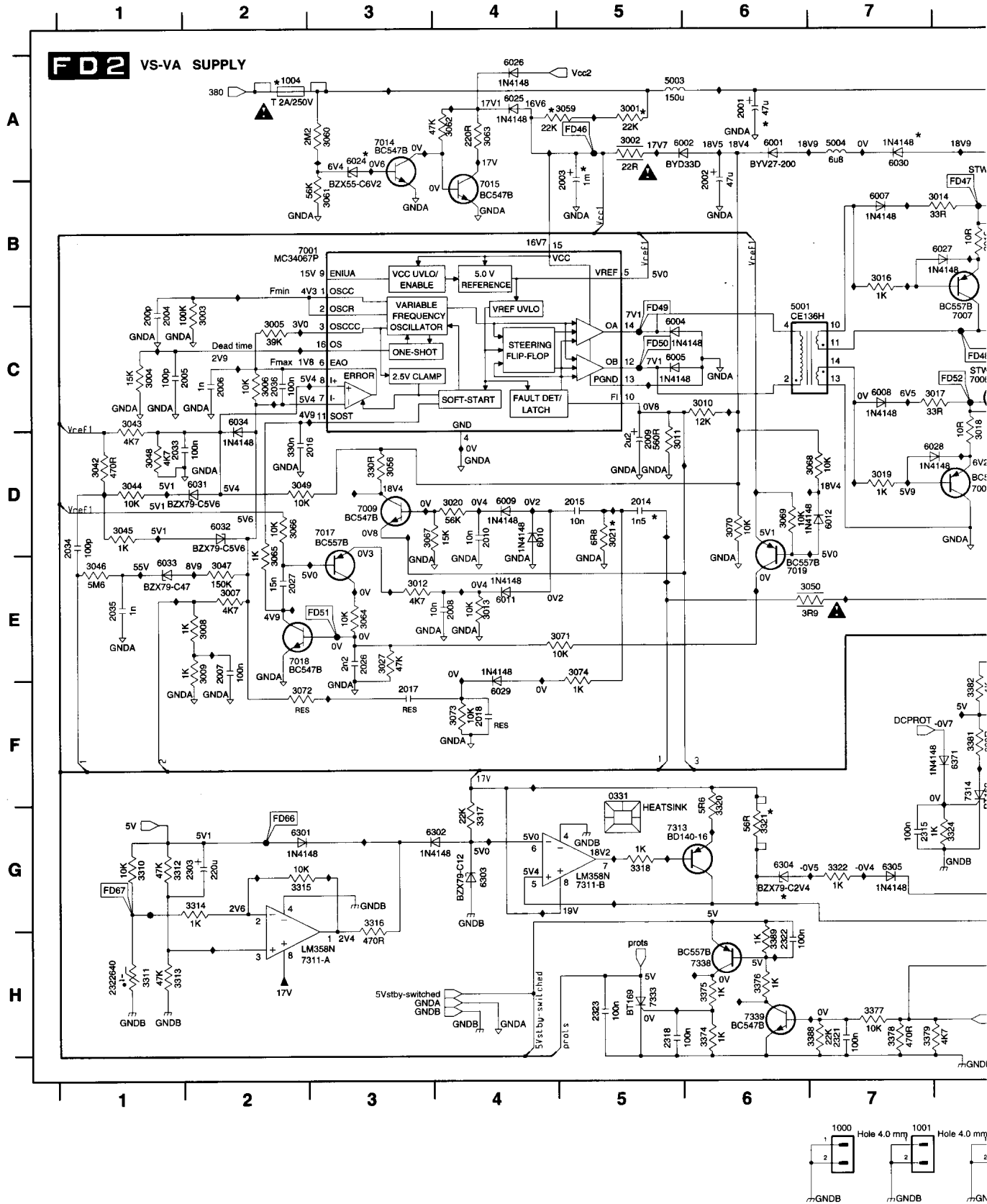
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0310 E15	2104 A1	2123 B10	2205 G8	2202 E11	3112 E3	3129 B12	3171 A8	3210 E7	3332 G1	3372 G4	5202 G6	6120 A10	6207 G9	7110 C11	7302 F
0313 A1	2105 B2	2124 B11	2206 H8	2216 H4	3113 E4	3130 B12	3172 B8	3211 G9	3333 H1	3373 G4	5203 D9	6121 B10	6208 E12	7111 B12	7330-A
0314 H15	2106 B2	2125 A12	2207 H8	2220 G9	3114 A7	3131 B12	3173 C8	3212 G8	3334 G2	3374 B12	5204 E9	6122 C10	6209 G9	7112 B13	7330-B
0315 D10	2107 D2	2126 F3	2208 G8	2234 G15	3115 A7	3132 C13	3174 C8	3213 G7	3335 H2	3375 A15	5205 E9	6123 B12	6210 G9	7113 A13	7331 G
0319 C15	2108 E4	2127 E3	2209 F9	2209 F10	3116 B7	3133 A13	3175 E4	3214 G9	3336 G3	3385 B15	5206 G9	6127 B7	6211 G9	7114 B14	7332 H
0324 A9	2109 D3	2128 A10	2210 F9	3100 D6	3117 C7	3134 B13	3176 E3	3215 H6	3337 H4	3386 B15	5207 F11	6128 C7	6212 G9	7115 B15	7333 H
0333 G10	2110 D4	2129 C10	2211 G10	3101 A4	3118 C7	3135 A13	3177 D5	3216 H7	3338 G4	3387 H15	5208 G10	6130 A8	6213 G9	7116 E2	7336 G
1101 A3	2111 C9	2130 E6	2212 F11	3102 A5	3119 C7	3136 A14	3180 C3	3217 H8	3339 G5	3390 E13	6101 A7	6131 B8	6214 G9	7117 B16	7337 G
1102 B9	2112 C8	2131 C10	2213 F11	3103 A2	3120 C3	3137 B14	3181 C4	3301 E12	3360 G11	3391 F13	6102 A6	6132 C8	6215 G9	7118 E2	7341 B
1103 G6	2113 A8	2132 C14	2214 H7	3104 B1	3121 D5	3138 C14	3182 C5	3302 E12	3361 H11	3392 G13	6104 B5	6133 D8	6216 G9	7119 E3	7370 H
1104 C9	2114 C5	2133 A6	2215 E8	3105 B2	3122 B11	3139 A14	3201 F7	3303 E12	3362 G11	3393 F9	6105 B5	6134 E5	6217 G9	7120 B11	7371 F
1105 A10	2115 C4	2134 B13	2216 E8	3106 B2	3123 B11	3140 C3	3202 G7	3304 E13	3363 H11	3399 H10	6107 A7	6135 C2	6218 G9	7121 B15	7372 G
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1202 E8	2117 C3	2201 F8	2221 E8	3108 C2	3125 C12	3164 E3	3204 G8	3306 F12	3365 H12	5102 C9	6109 C4	6202 E8	6203 G9	7123 E5	7374 H
2101 A7	2118 C4	2202 F7	2222 D7	3109 D2	3126 D11	3165 D2	3205 G9	3307 G13	3366 G12	5103 A4	6110 D4	6203 G9	6204 F10	7124 E5	7375 H
2102 A6	2120 A11	2203 G7	2223 G9	3110 B5	3127 A12	3166 D3	3206 F8	3308 F13	3370 G14	5104 A7	6111 D4	6204 F10	6205 F10	7125 E5	7376 H



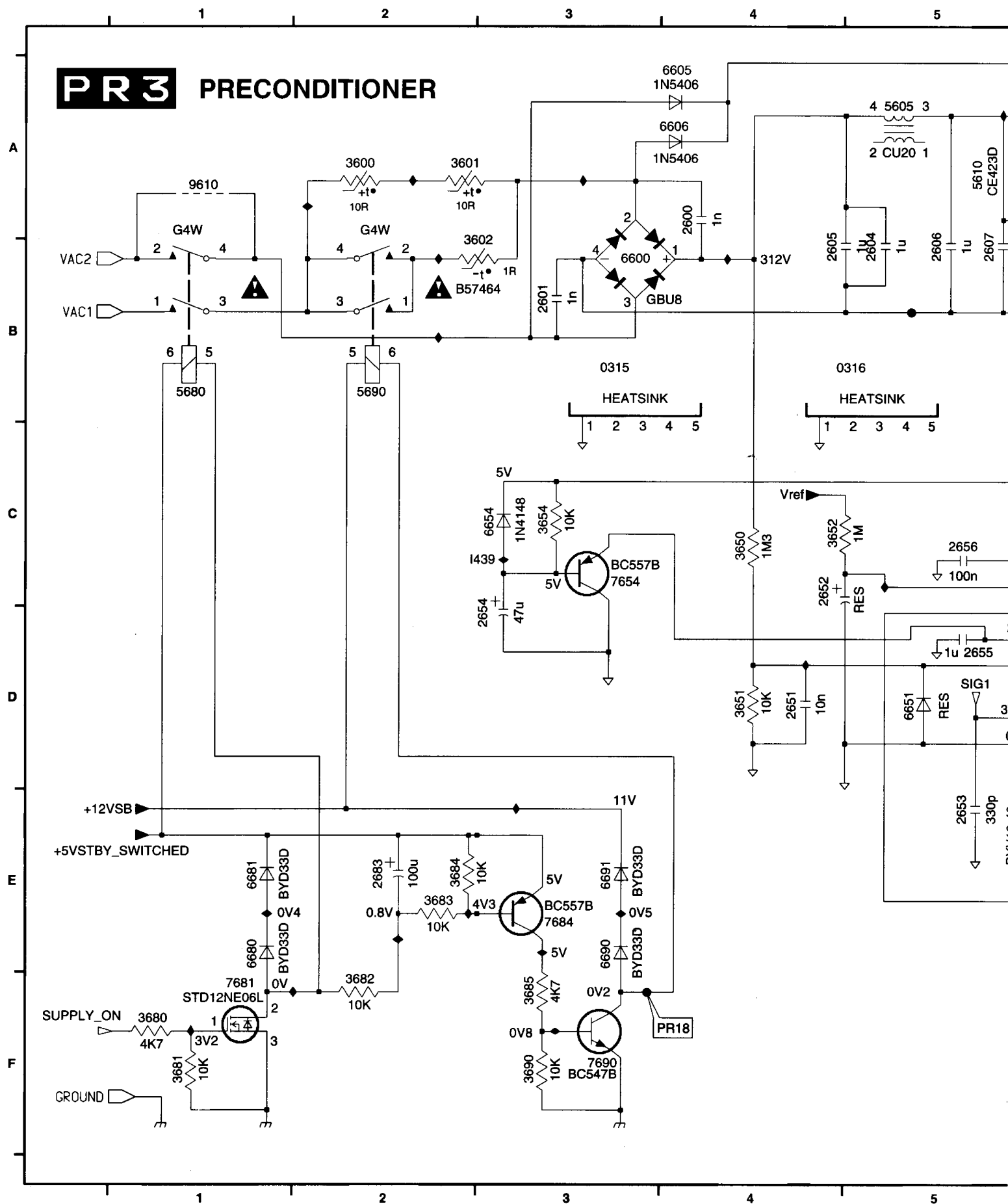


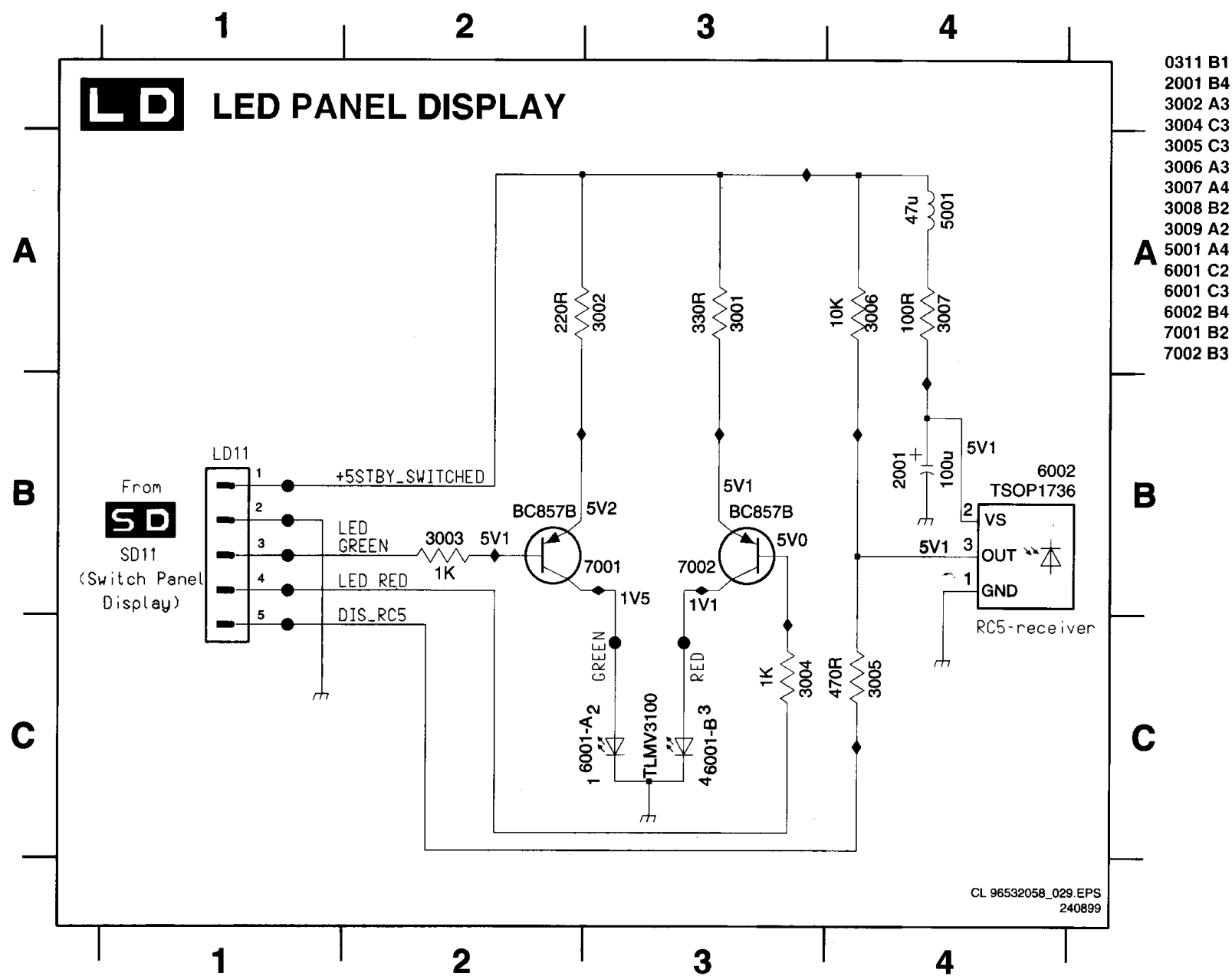
VsVa supply (FD)

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0317 B15	2010 D4	2027 E2	2308 F11	3003 C2	3019 D7	3036 A14	3057 A11	3073 F4	3321 G6	3356 H14	5003 A5	6025 A4	6312 E11	634
0318 D15	2011 D9	2028 A10	2309 F12	3004 C1	3020 D4	3037 C13	3058 A13	3074 E5	3322 G7	3357 H15	5004 A7	6026 A4	6313 F11	634
0322 A9	2012 C8	2029 B10	2310 G11	3005 C2	3021 D5	3038 C14	3059 A5	3075 B9	3323 G10	3374 H6	6001 A6	6027 B8	6314 G11	634
0331 F5	2013 B8	2030 F9	2311 G12	3006 C2	3022 A11	3039 B12	3060 A3	3076 C9	3324 G8	3375 H6	6002 A6	6028 D8	6315 H11	634
0339 A13	2014 D5	2032 C14	2312 H11	3007 E2	3023 B11	3040 A12	3061 B3	3077 D9	3325 H9	3376 H6	6004 C5	6029 F4	6316 H13	634
1004 A2	2015 D5	2033 D1	2313 H12	3008 E2	3024 A12	3041 C12	3062 A4	3078 D9	3340 D12	3377 H7	6005 C5	6007 B7	6317 B9	634
1005 B10	2016 D2	2034 D1	2314 H10	3009 E2	3025 C12	3042 D1	3063 A4	3079 D9	3341 D12	3378 H7	6006 B7	6008 C7	6318 C8	634
2001 A6	2017 F3	2035 E1	2315 G7	3010 C6	3026 C12	3043 C1	3064 E3	3080 D9	3342 D12	3379 H7	6007 B7	6009 D4	6319 C9	634
2002 B6	2018 F4	2036 C2	2317 H15	3011 D5	3027 E2	3044 D1	3065 E2	3081 D9	3343 E12	3380 F8	6010 D4	6011 E4	6320 D8	634
2003 B5	2020 A11	2037 B13	2318 H5	3012 E3	3028 B12	3045 D1	3066 D2	3082 D9	3344 E12	3381 F8	6010 D4	6012 D7	6321 D11	634
2004 C1	2021 A12	2038 C14	2319 H14	3013 E4	3030 B13	3046 E1	3067 D3	3083 D9	3345 E12	3382 F8	6011 E4	6013 G2	6322 E11	634
2005 C1	2022 C10	2039 G2	2321 H7	3014 B8	3031 B13	3047 E2	3068 D7	3084 D9	3346 G12	3383 G9	6012 D7	6014 G2	6323 F11	634
2006 C2	2023 A10	2040 D11	2322 H6	3015 B8	3032 C13	3048 D1	3069 D6	3085 D9	3347 G12	3384 H7	6013 G2	6015 A11	6324 G11	634
2007 E2	2024 B12	2041 D12	2323 H5	3016 B7	3033 A13	3049 D2	3070 D6	3086 D9	3348 G12	3385 H7	6014 G2	6016 B10	6325 H11	634
2008 E4	2025 A12	2042 E11	3001 A5	3017 C8	3034 B13	3050 E7	3071 E5	3087 D9	3349 G12	3386 H7	6015 A11	6017 B10	6326 H14	634

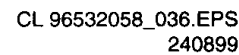


Pre conditioner (PR)

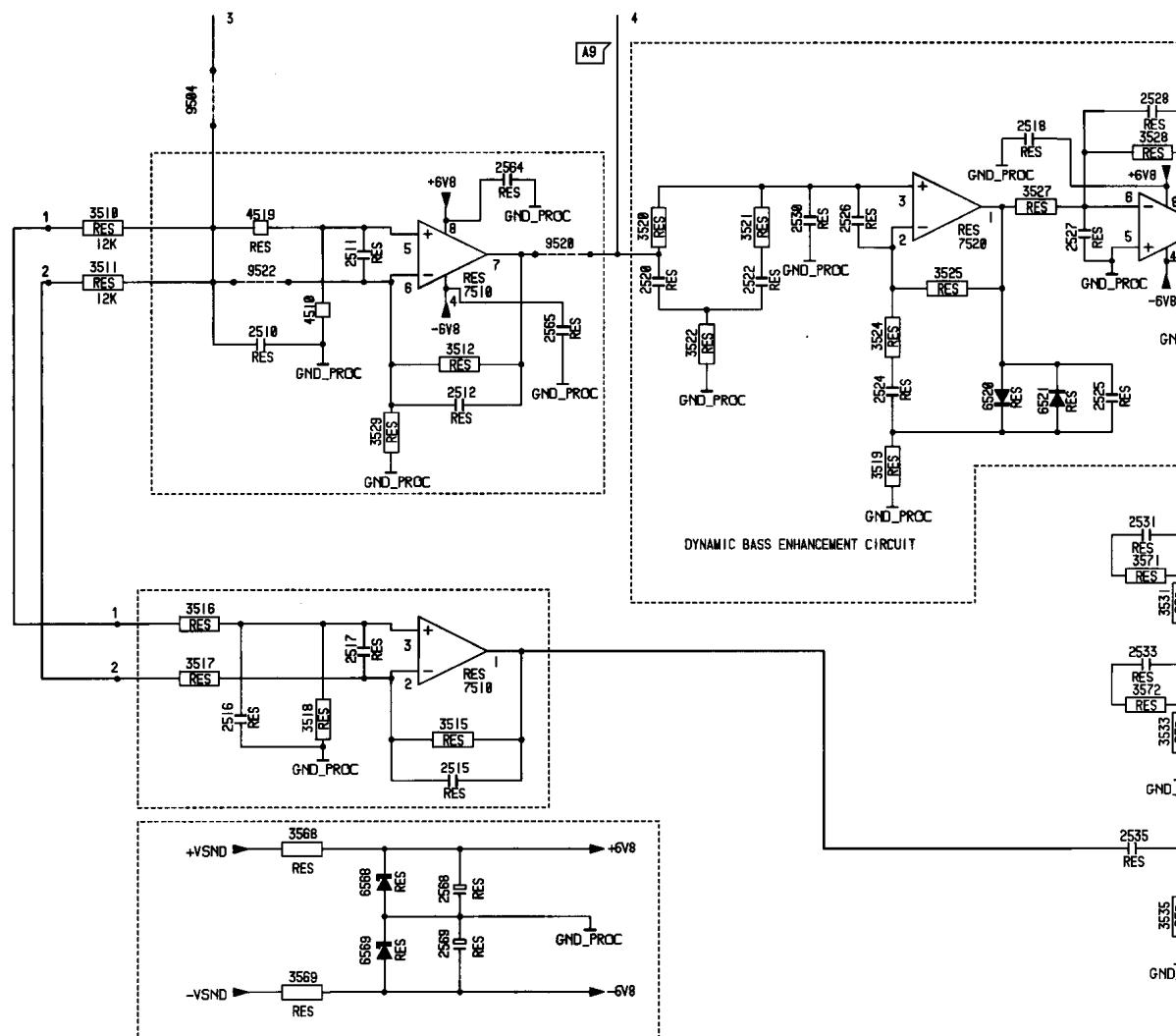


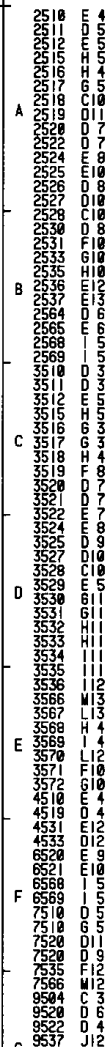




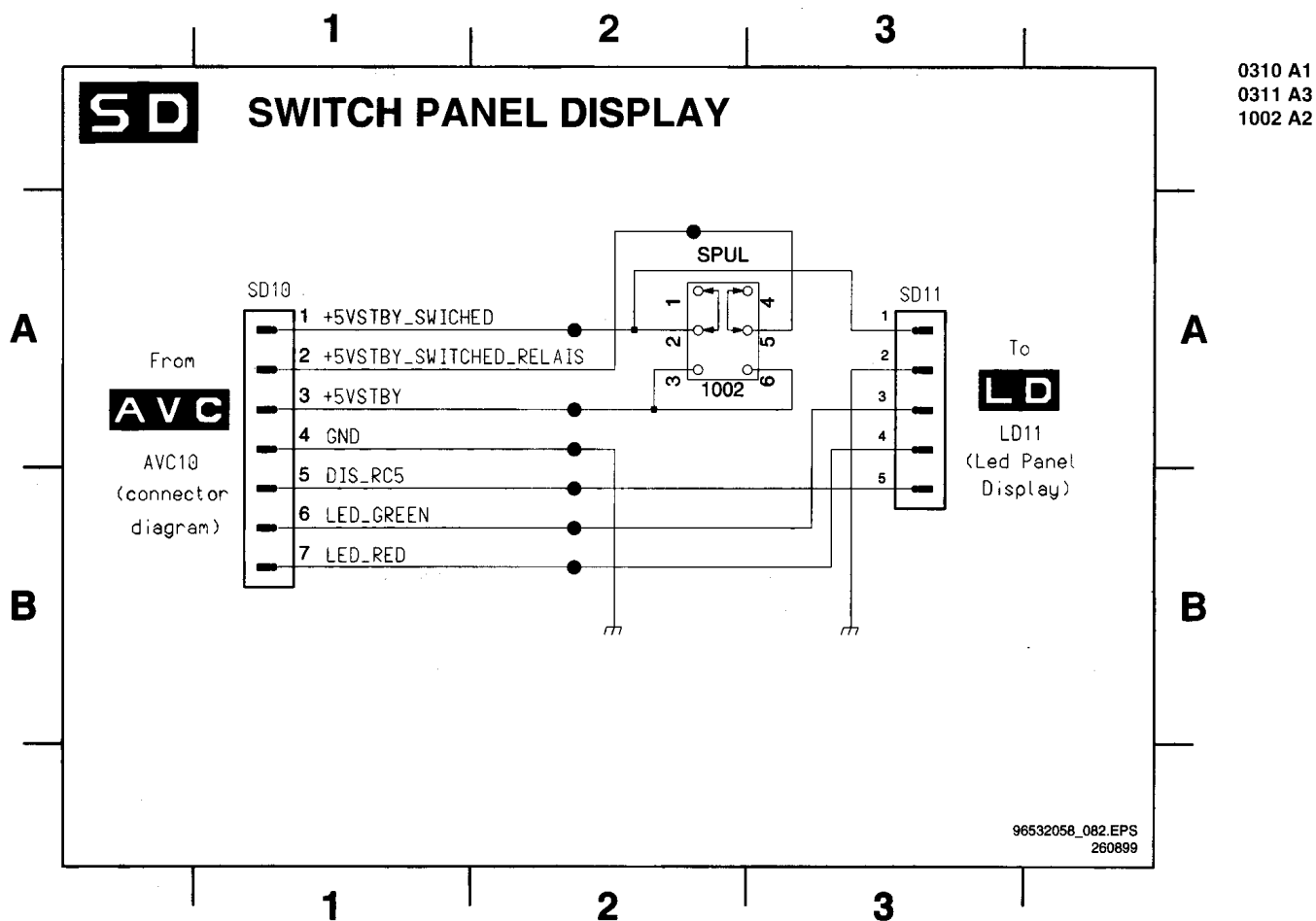
A

Audio amplifier A2

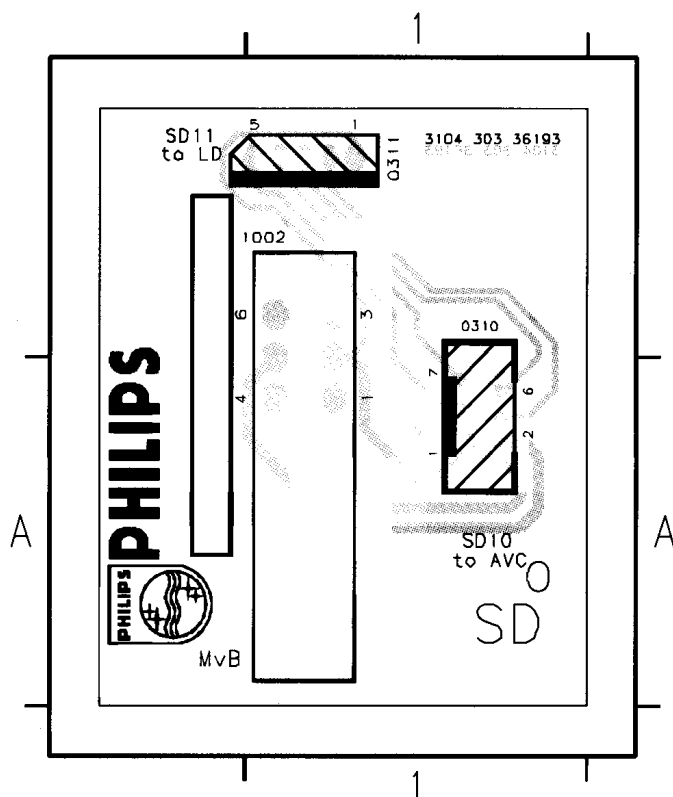
A**AUDIO AMPLIFIER**



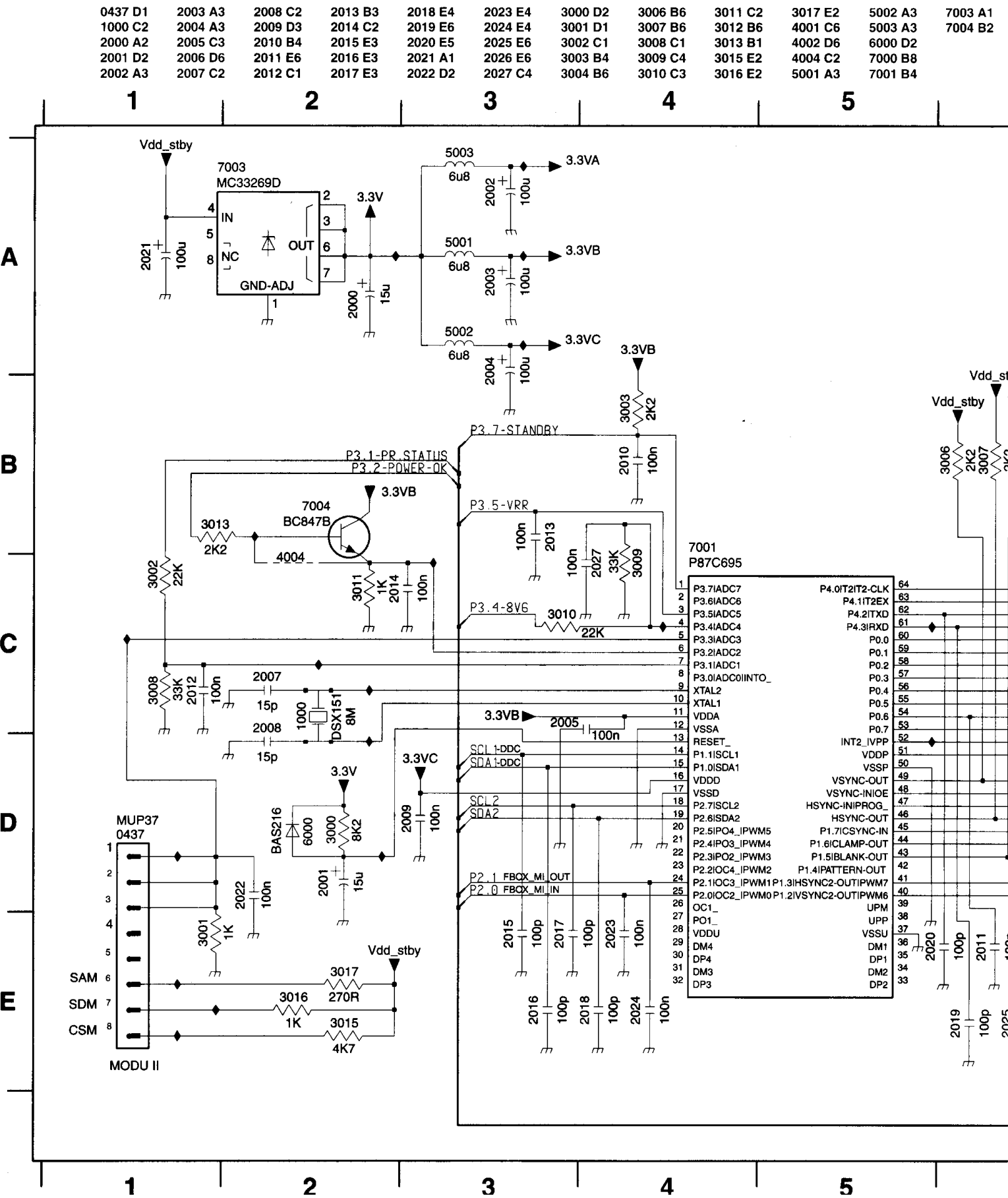
Switch panel

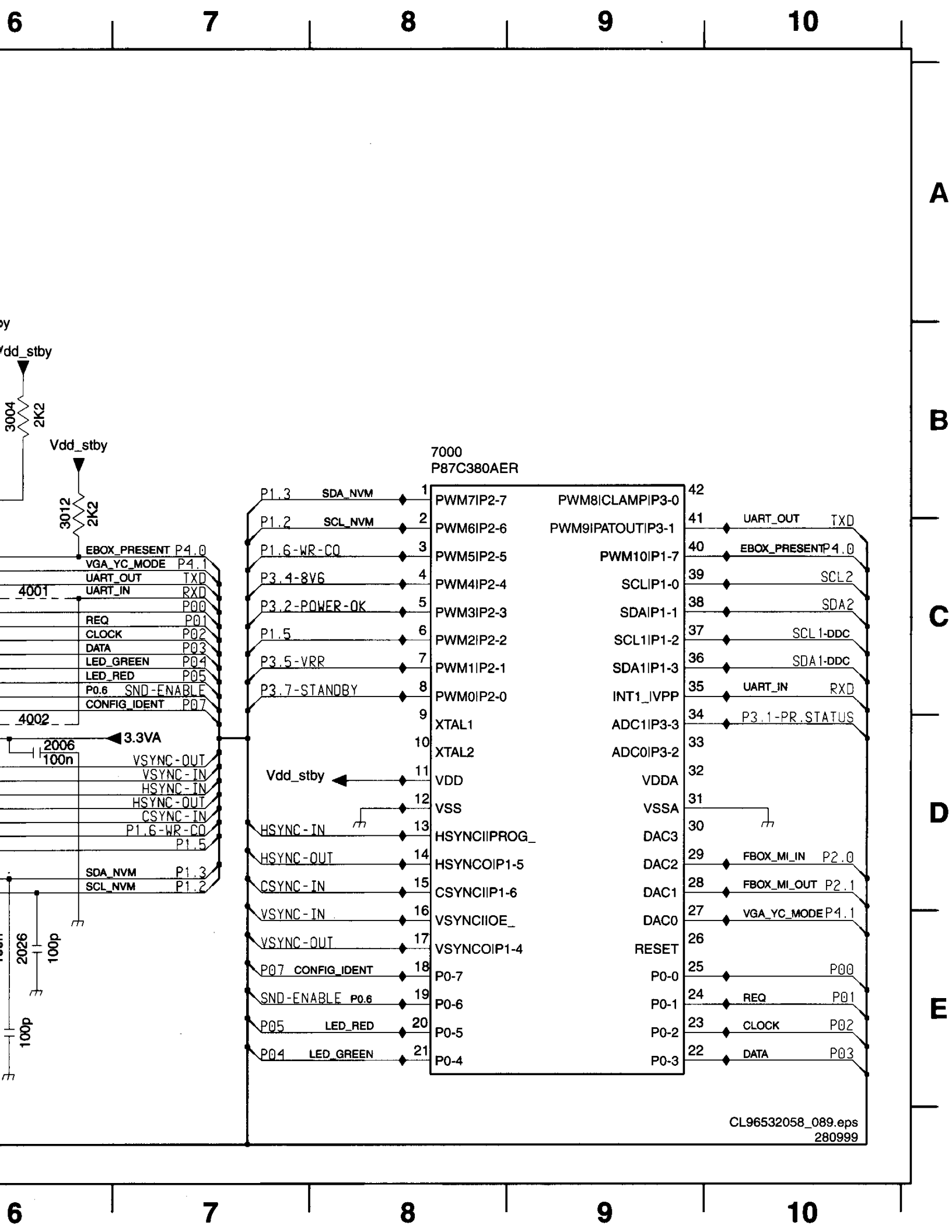


Switch panel (component side)



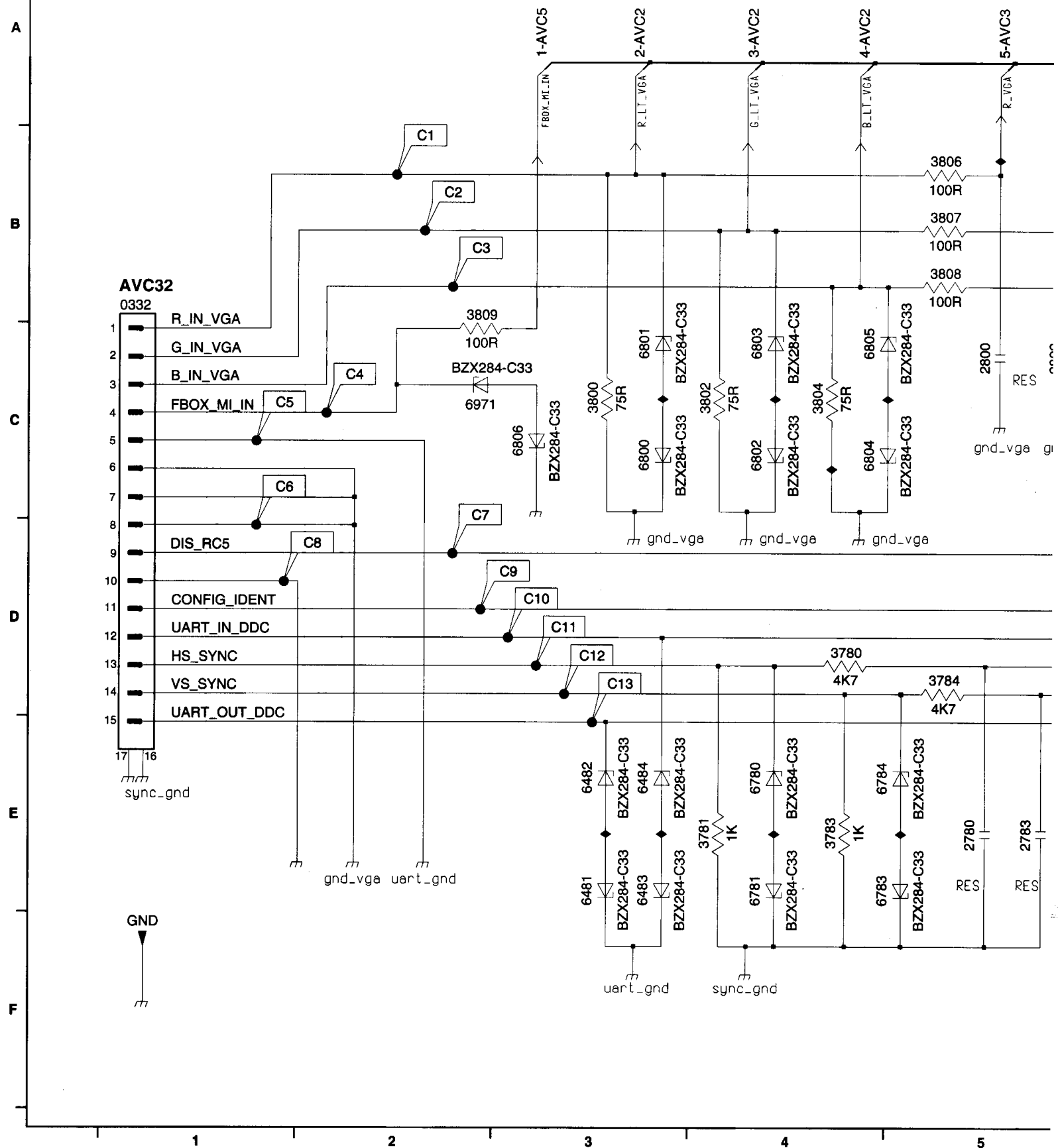
Monitor microprocessor panel

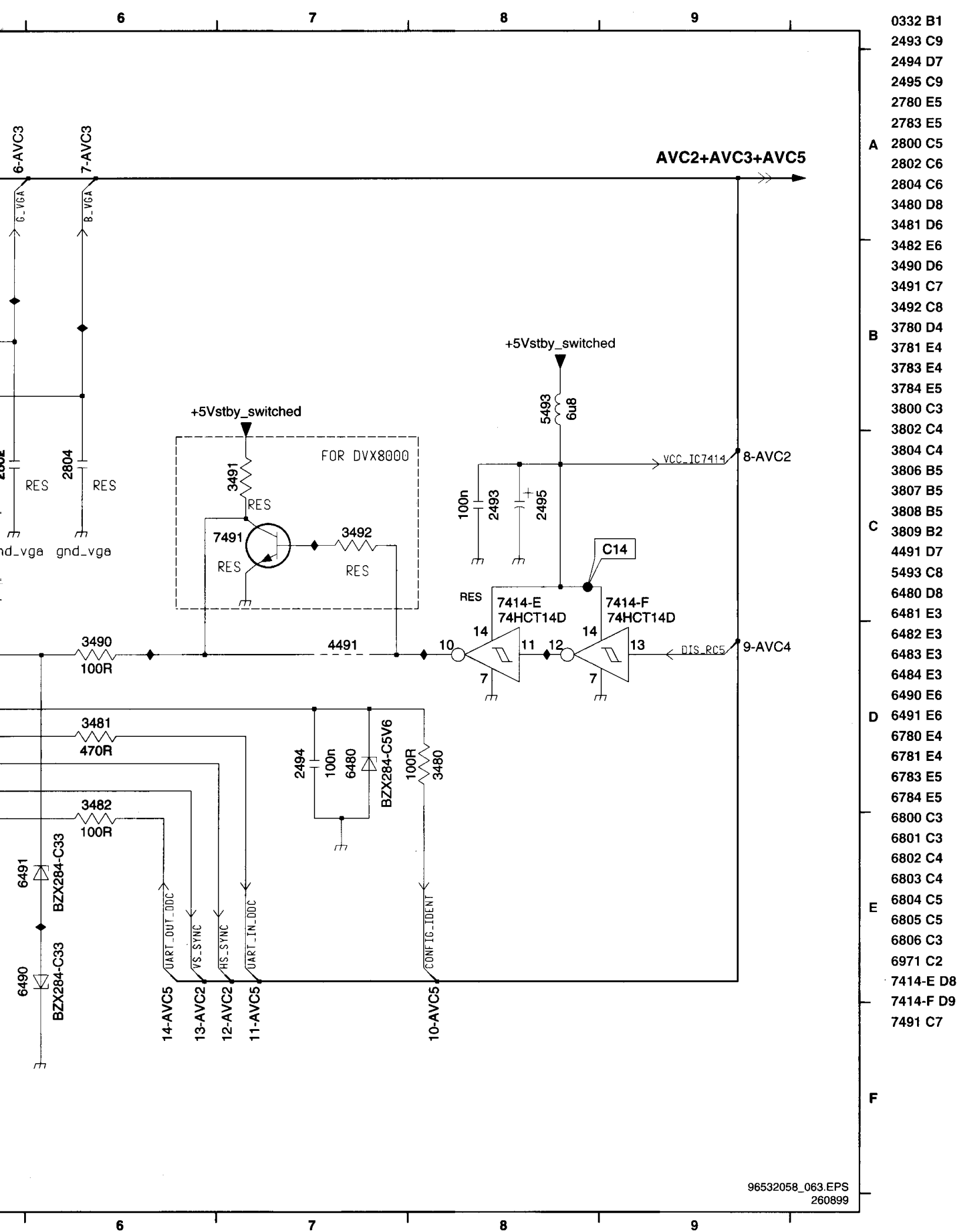




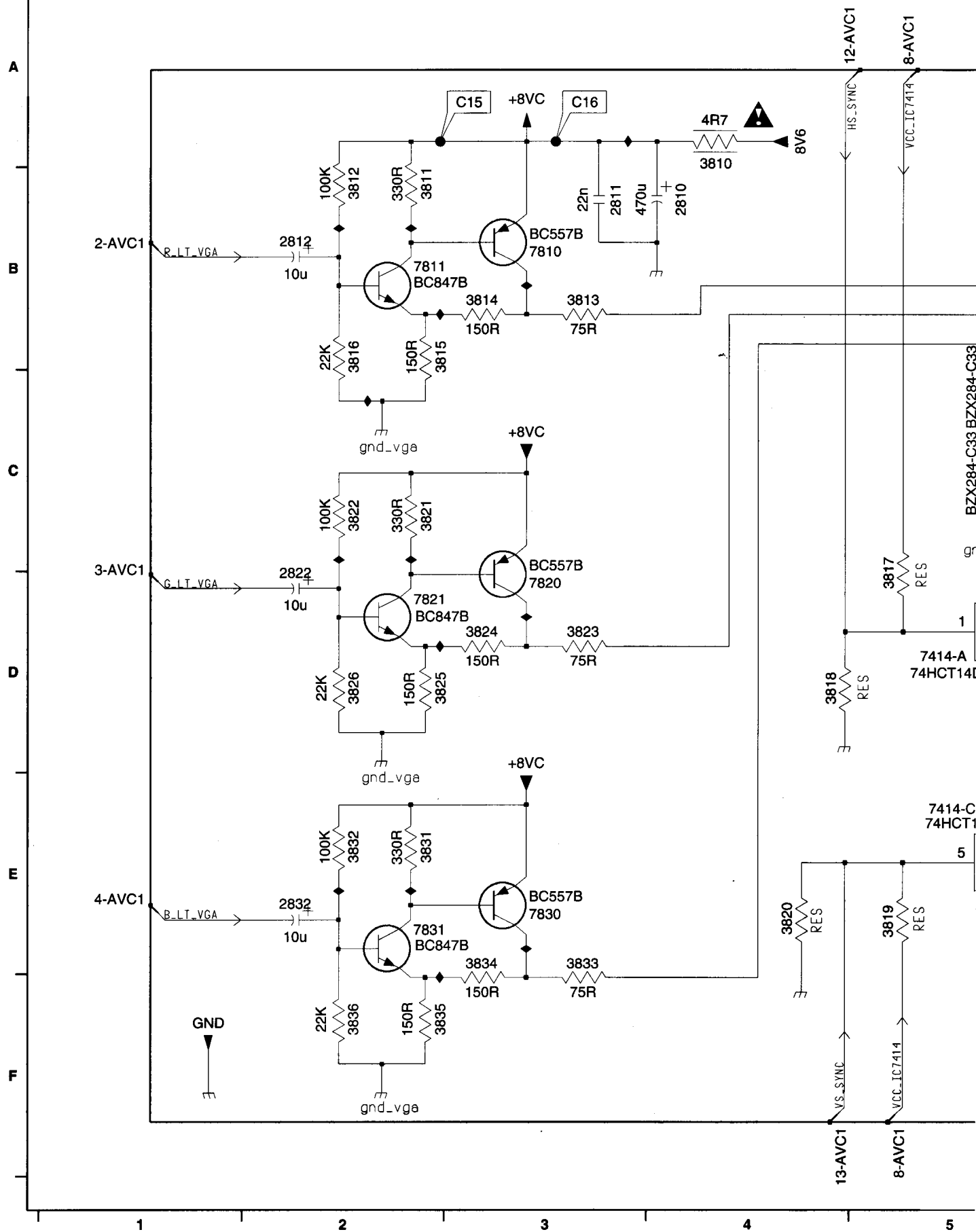
AV control

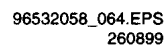
AVC 1 RGB INPUT





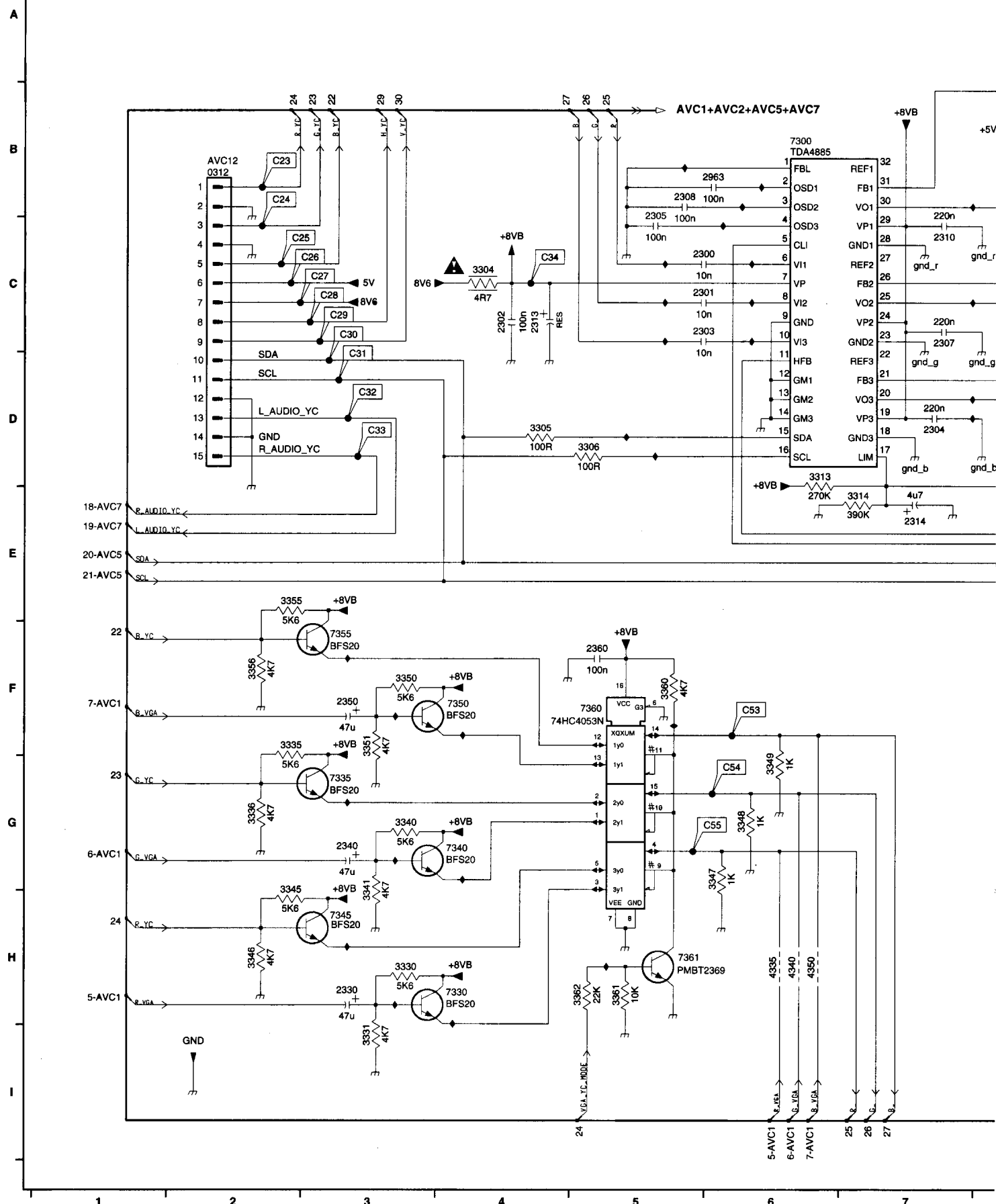
AV control

AVC2**RGB OUTPUT**

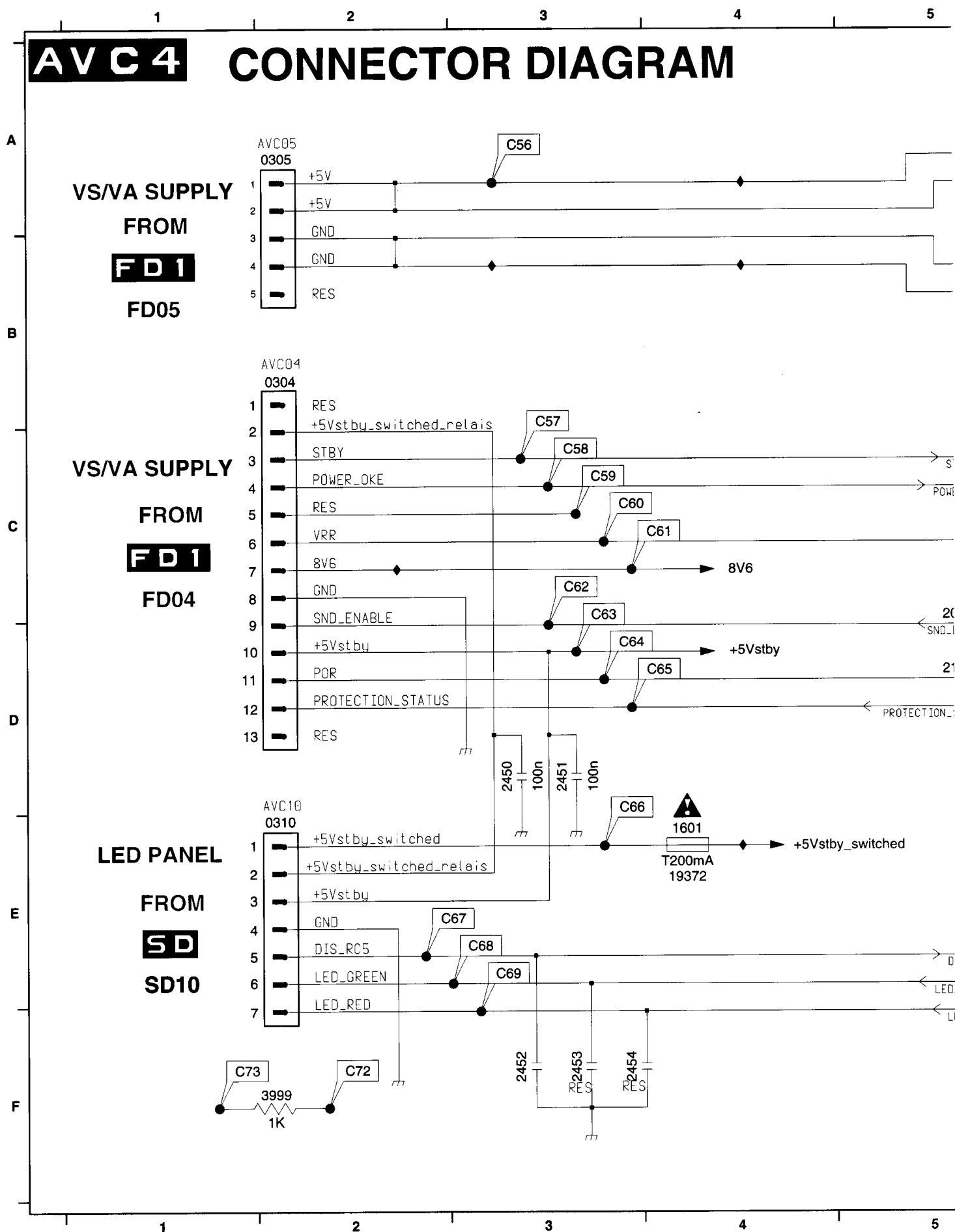


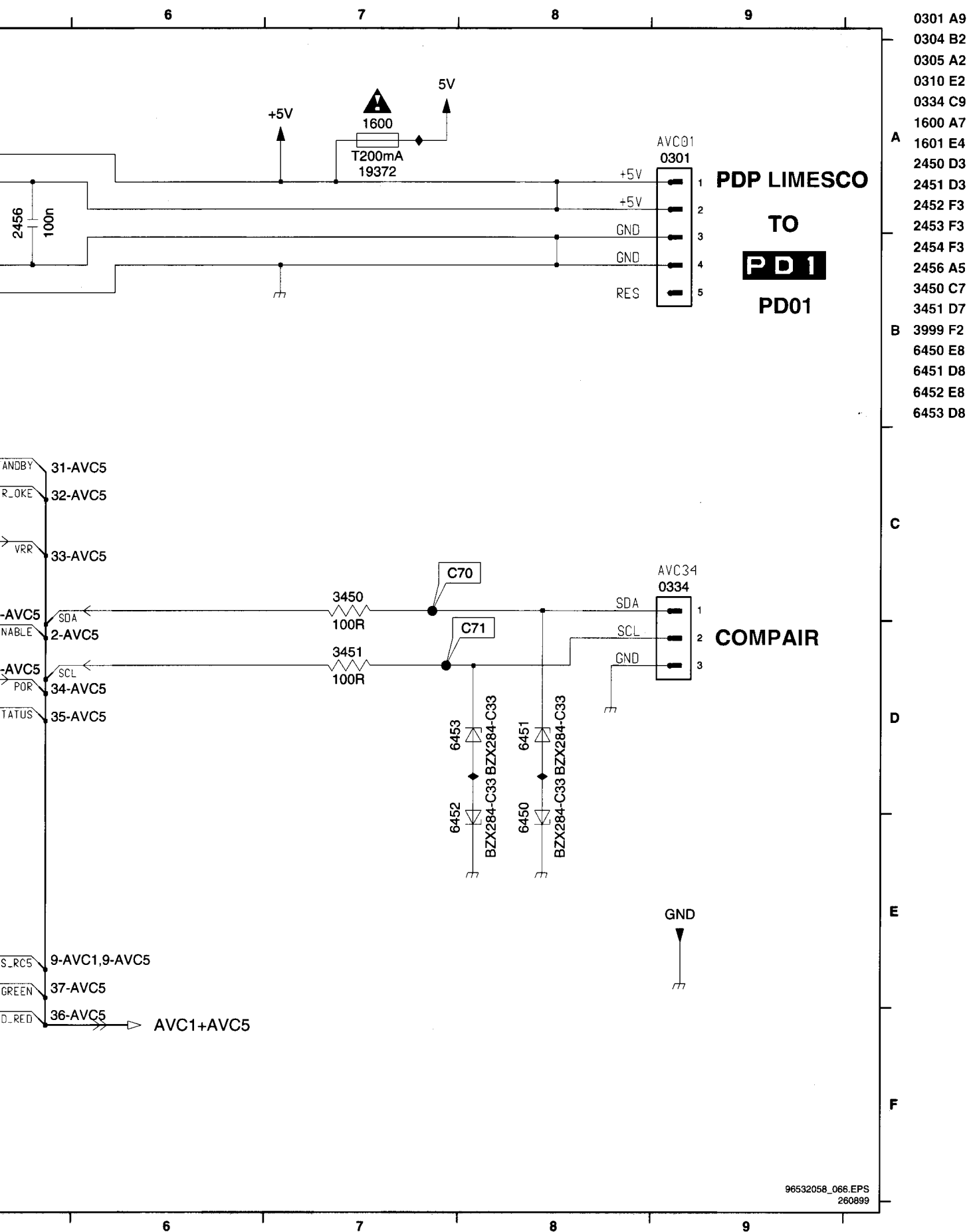
AV control

AVC3 VIDEO CONTROL



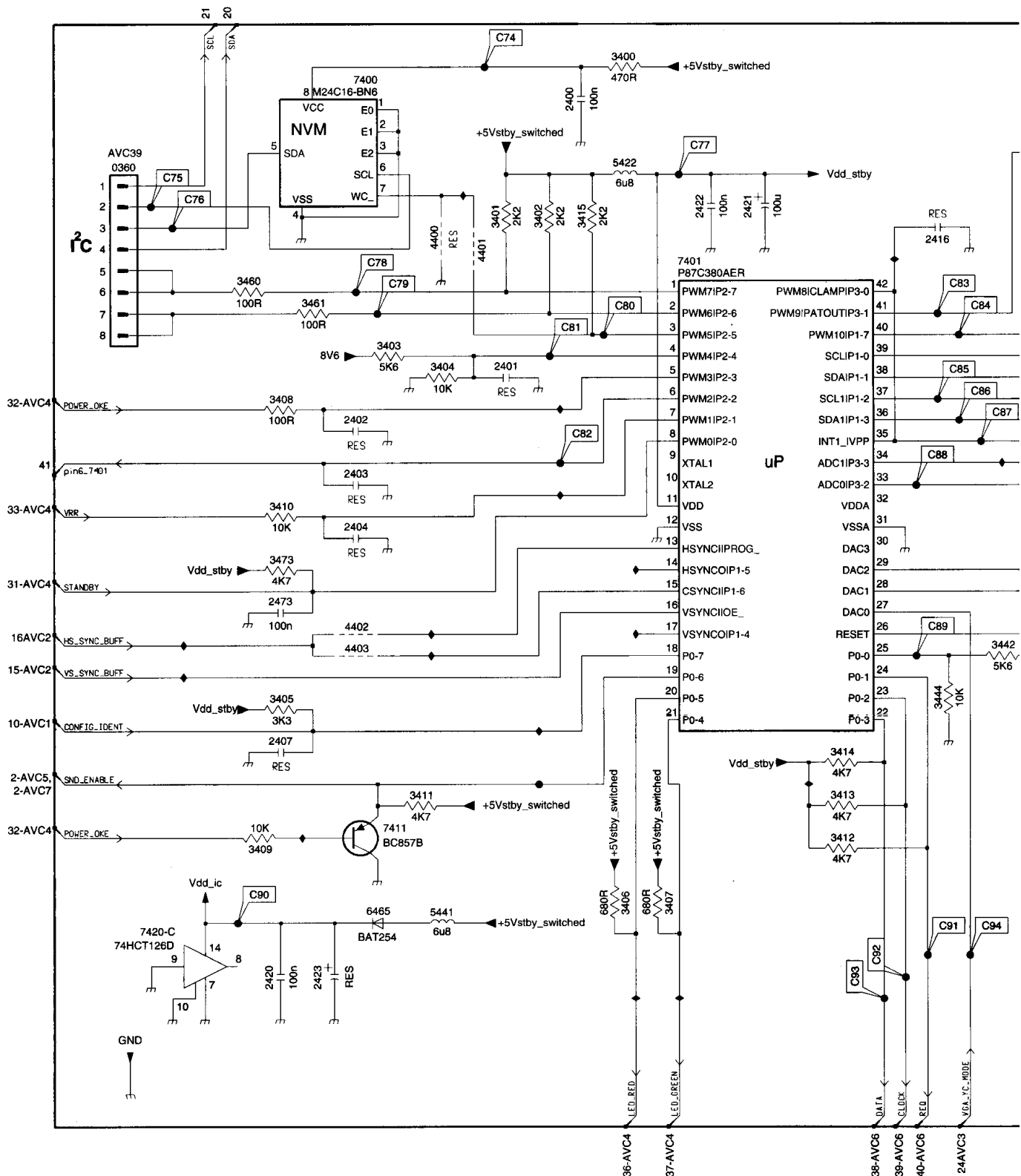
AV control



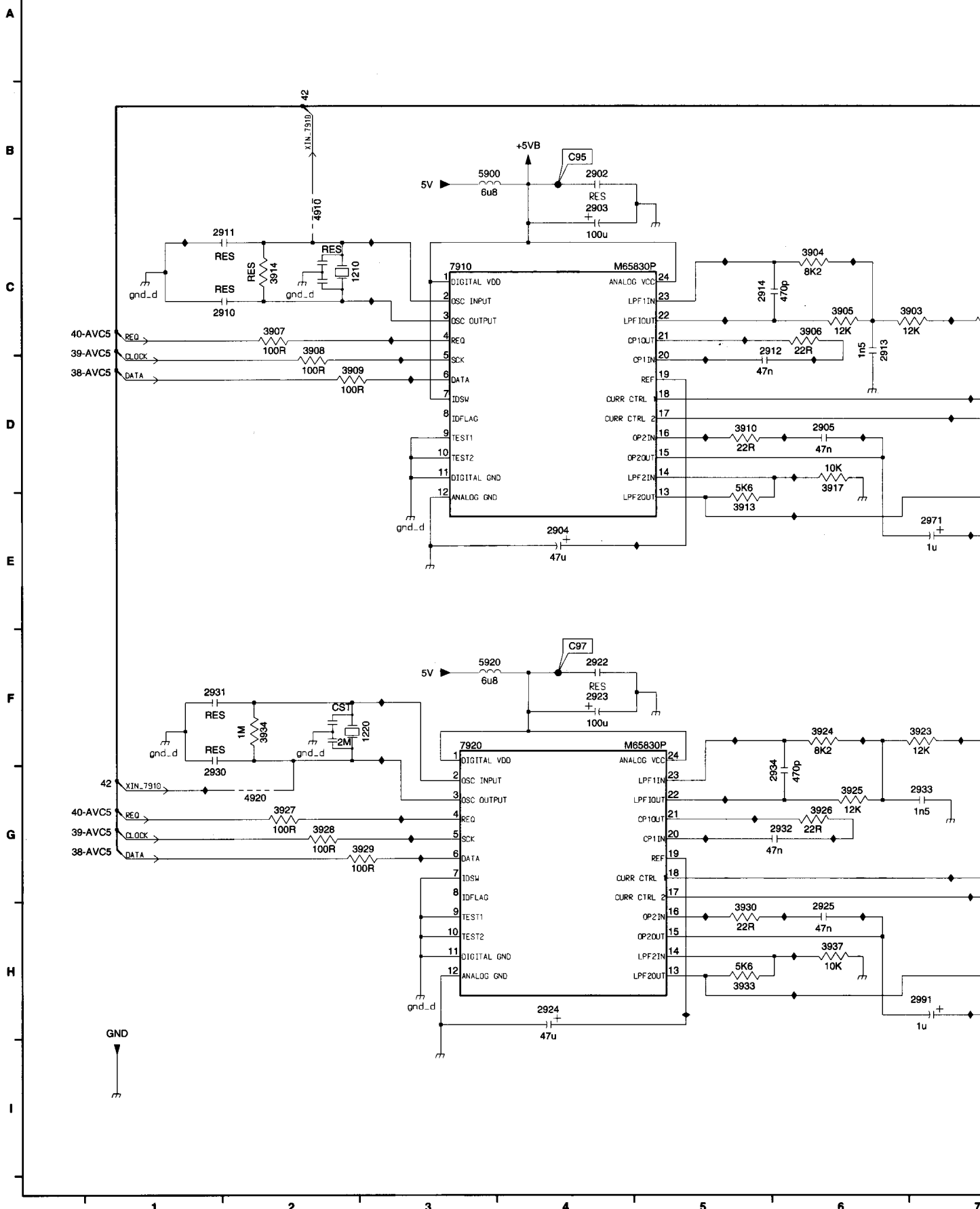


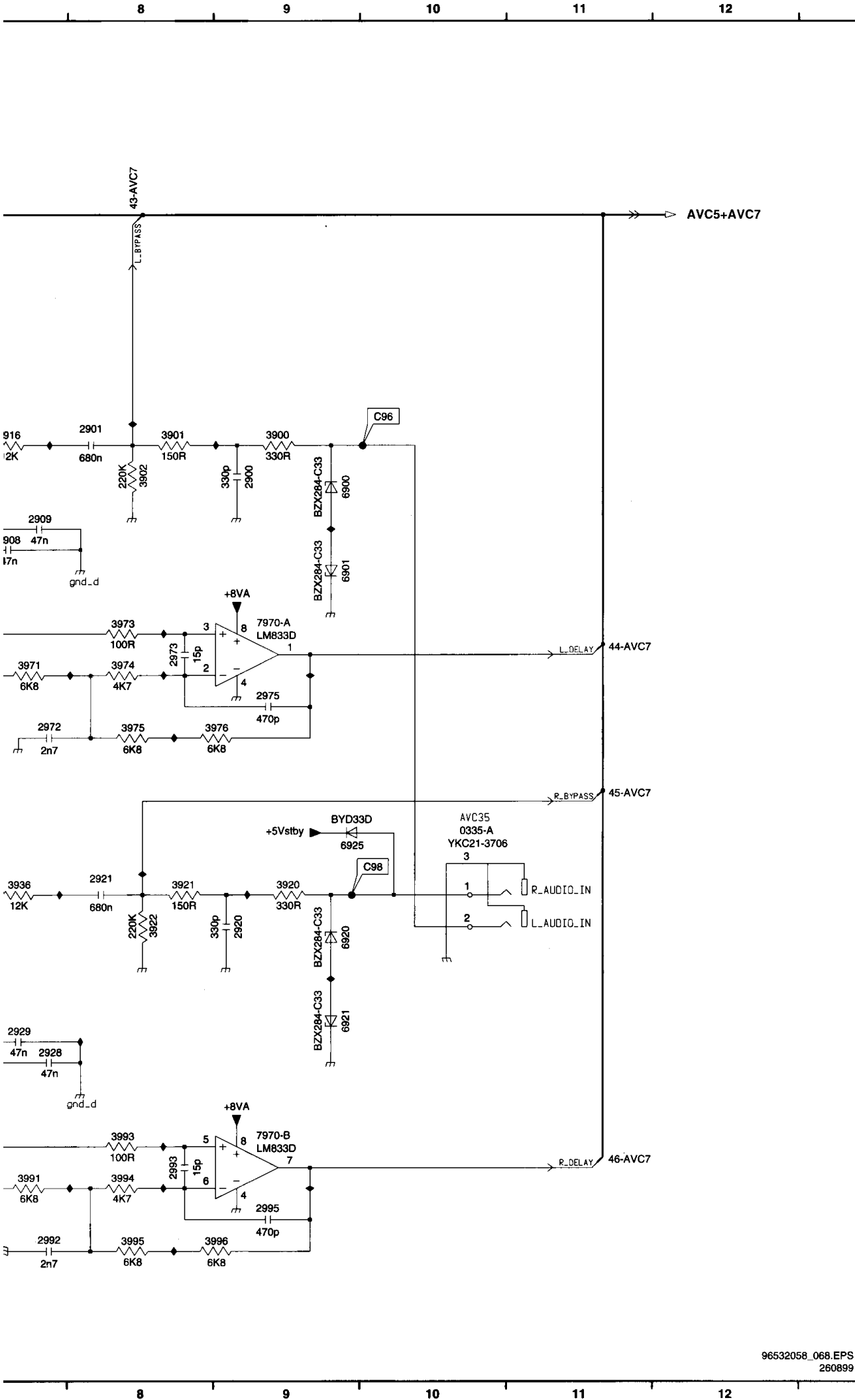
AV control

AVC5 CONTROL



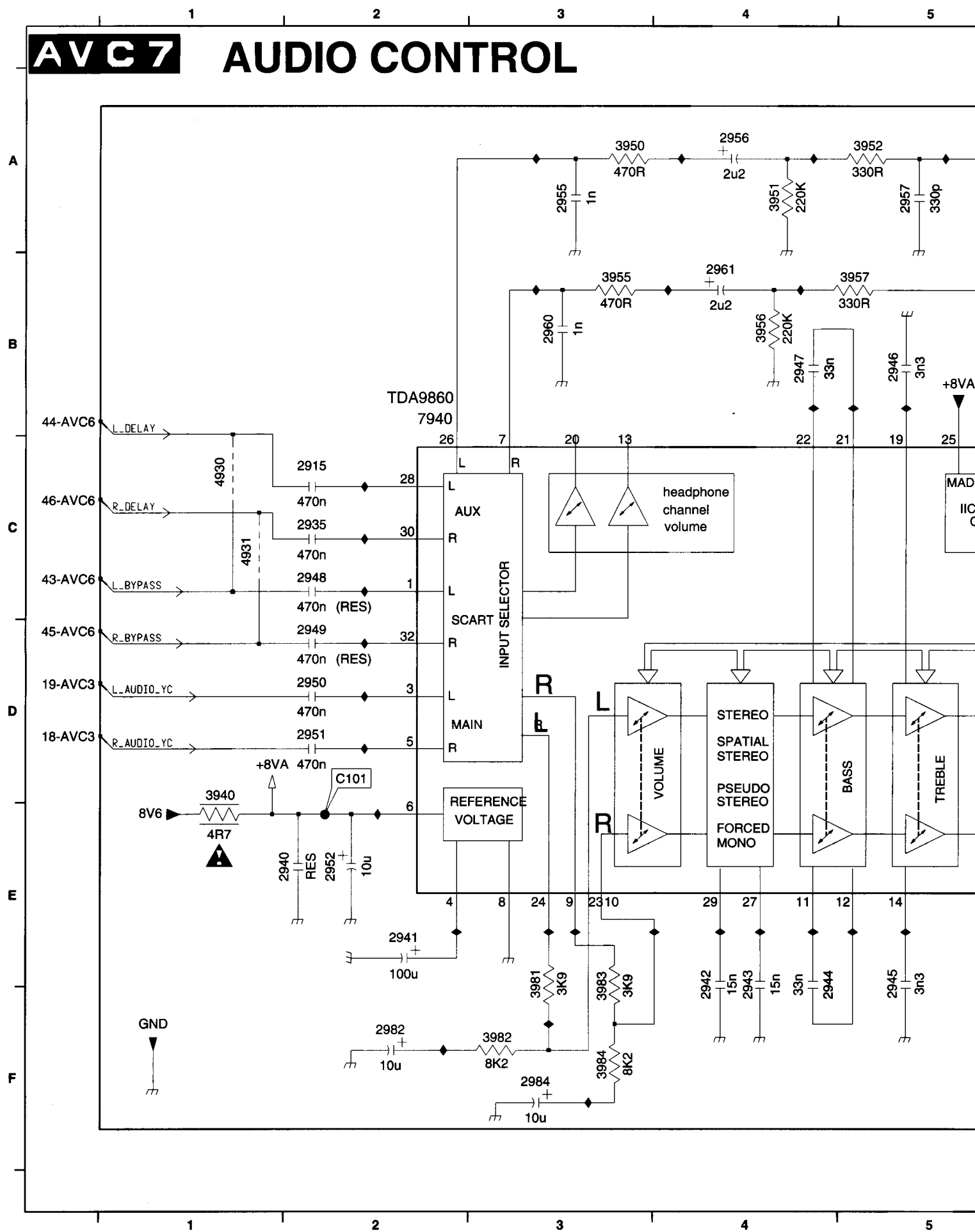
AV control

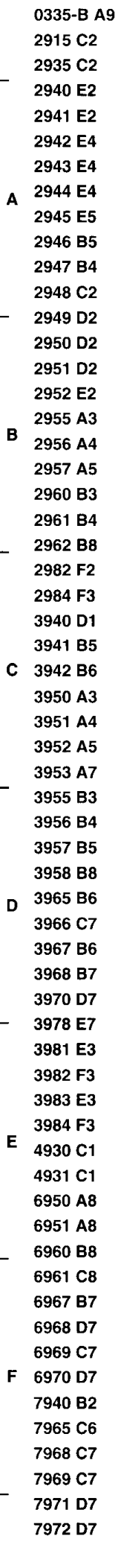
AVC6**AUDIO PROCESSING**



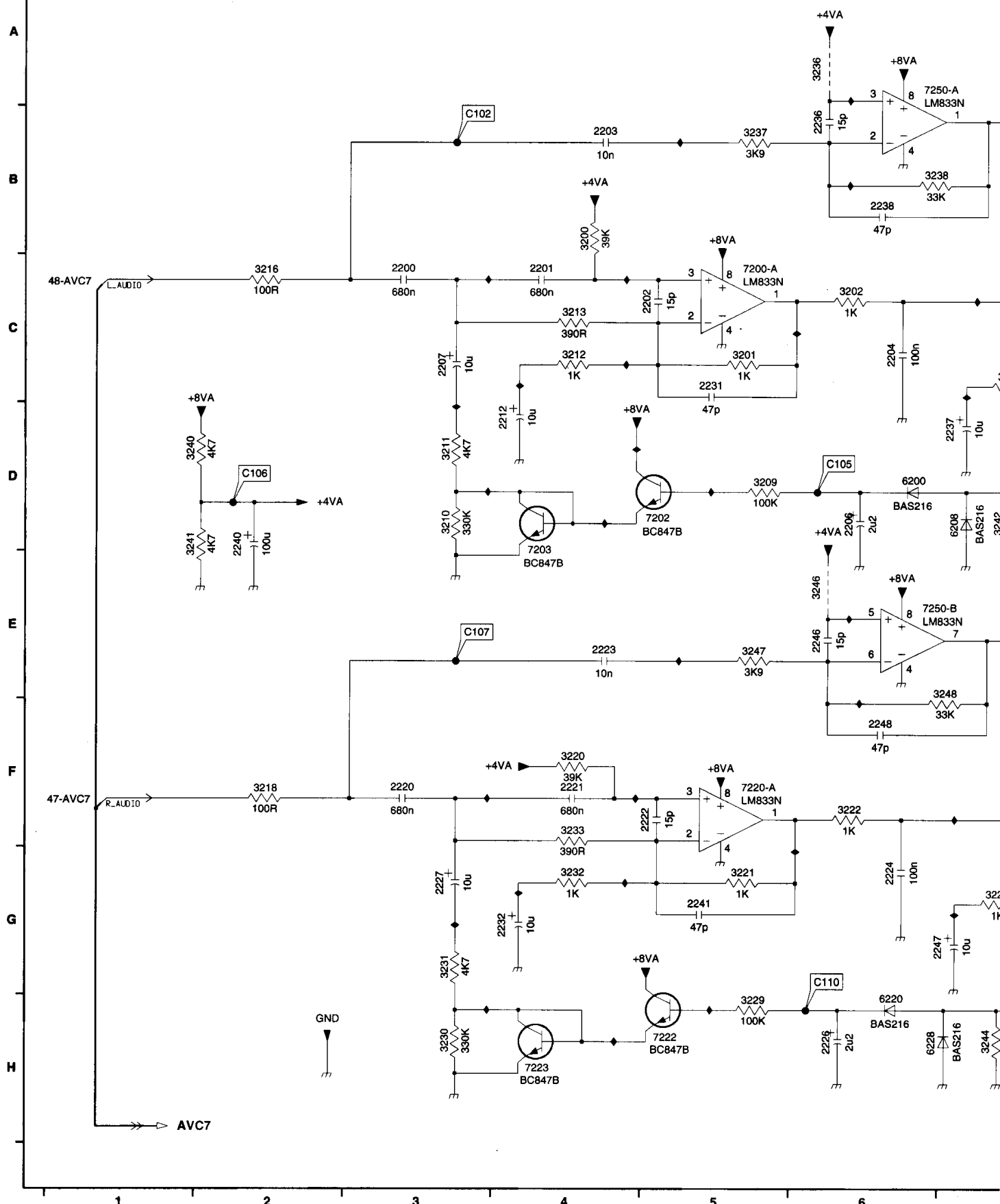
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	1210 B2	3994 H11
	1220 F2	3995 H11
	2900 A8	3996 H11
	2901 A8	4910 B1
	2902 A4	4920 G3
A	2903 A4	5900 A3
	2904 C4	5920 E4
	2905 B6	6900 A9
	2908 B7	6901 B9
	2909 B7	6920 F9
	2910 C3	6921 F9
	2911 C1	6925 E11
B	2912 B6	7910 A4
	2913 B6	7920 F4
	2914 A6	7970-A C11
	2920 F8	7970-B G11
	2921 E8	
	2922 E5	
	2923 E4	
	2924 G4	
C	2925 G6	
	2928 G7	
	2929 F7	
	2930 G3	
	2931 G1	
	2932 F6	
	2933 F7	
	2934 F6	
D	2971 C10	
	2972 D10	
	2973 C11	
	2975 D11	
	2991 H10	
	2992 I10	
	2993 H11	
E	2995 H11	
	3900 A8	
	3901 A8	
	3902 A8	
	3903 A7	
	3904 A6	
	3905 B6	
	3906 B6	
F	3907 B3	
	3908 B3	
	3909 B3	
	3910 B6	
	3913 C6	
	3914 C2	
	3916 A7	
	3917 C6	
G	3920 E8	
	3921 E8	
	3922 F8	
	3923 E7	
	3924 E6	
	3925 F6	
	3926 F6	
	3927 F3	
H	3928 F3	
	3929 F3	
	3930 G6	
	3933 G6	
	3934 G2	
	3936 E7	
	3937 G6	
I	3971 C10	
	3973 C11	
	3974 C11	
	3975 D11	
	3976 D11	
	3991 H10	

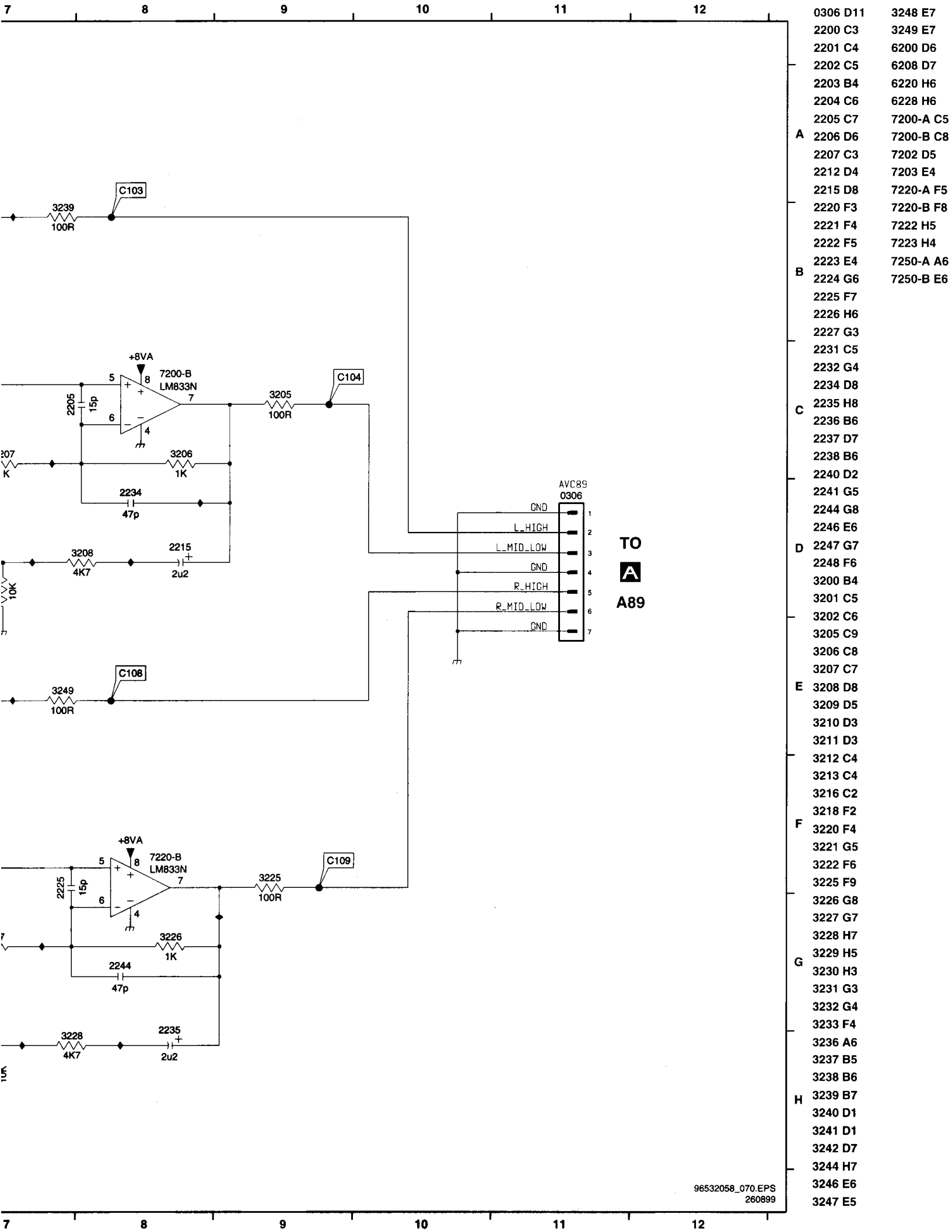
AV control





AVC8 AUDIO FILTER + DBE





PDP limesco

PD 1 INTERCONNECT

A

B

C

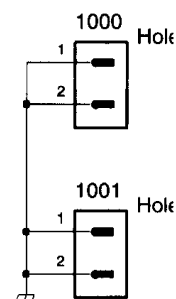
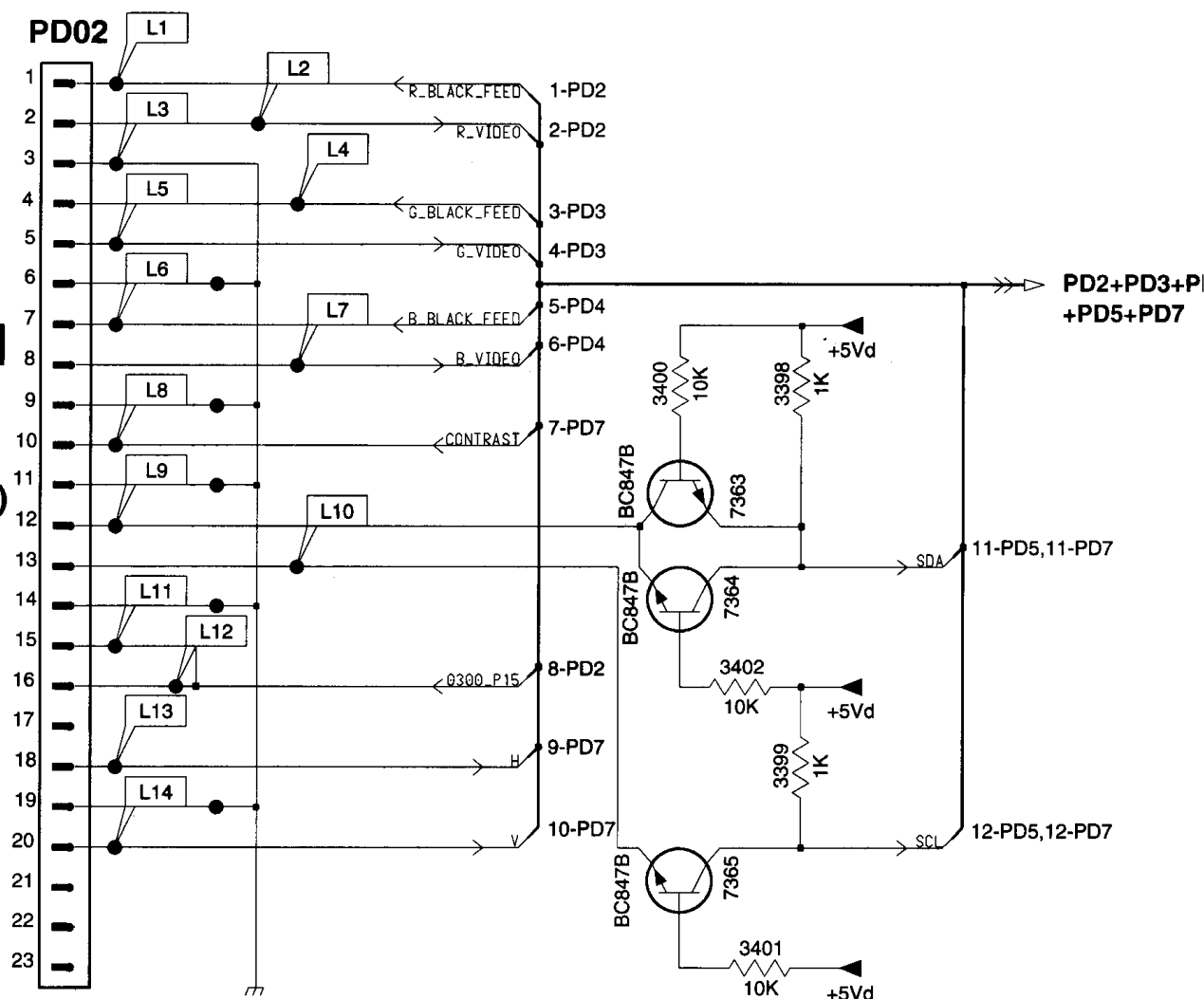
D

E

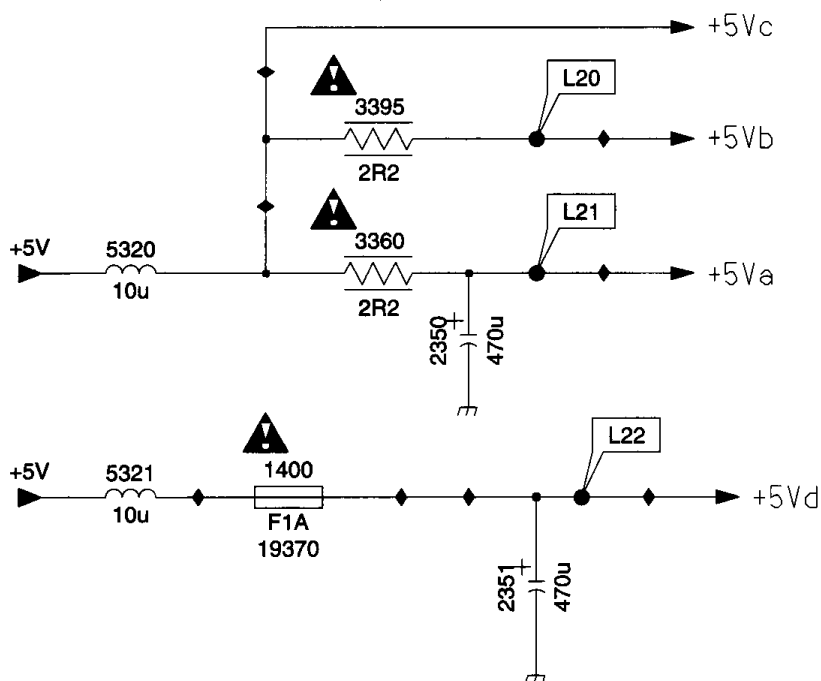
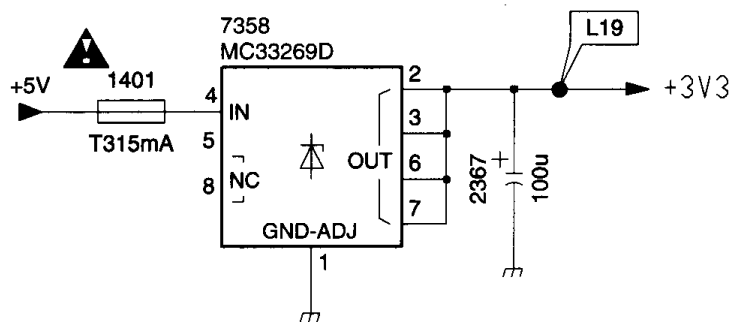
F

TO
AVC3
AVC02
(VIDEO
CONTROL)

TO
AVC4
AVC01
(CONNECTOR
DIAGRAM)

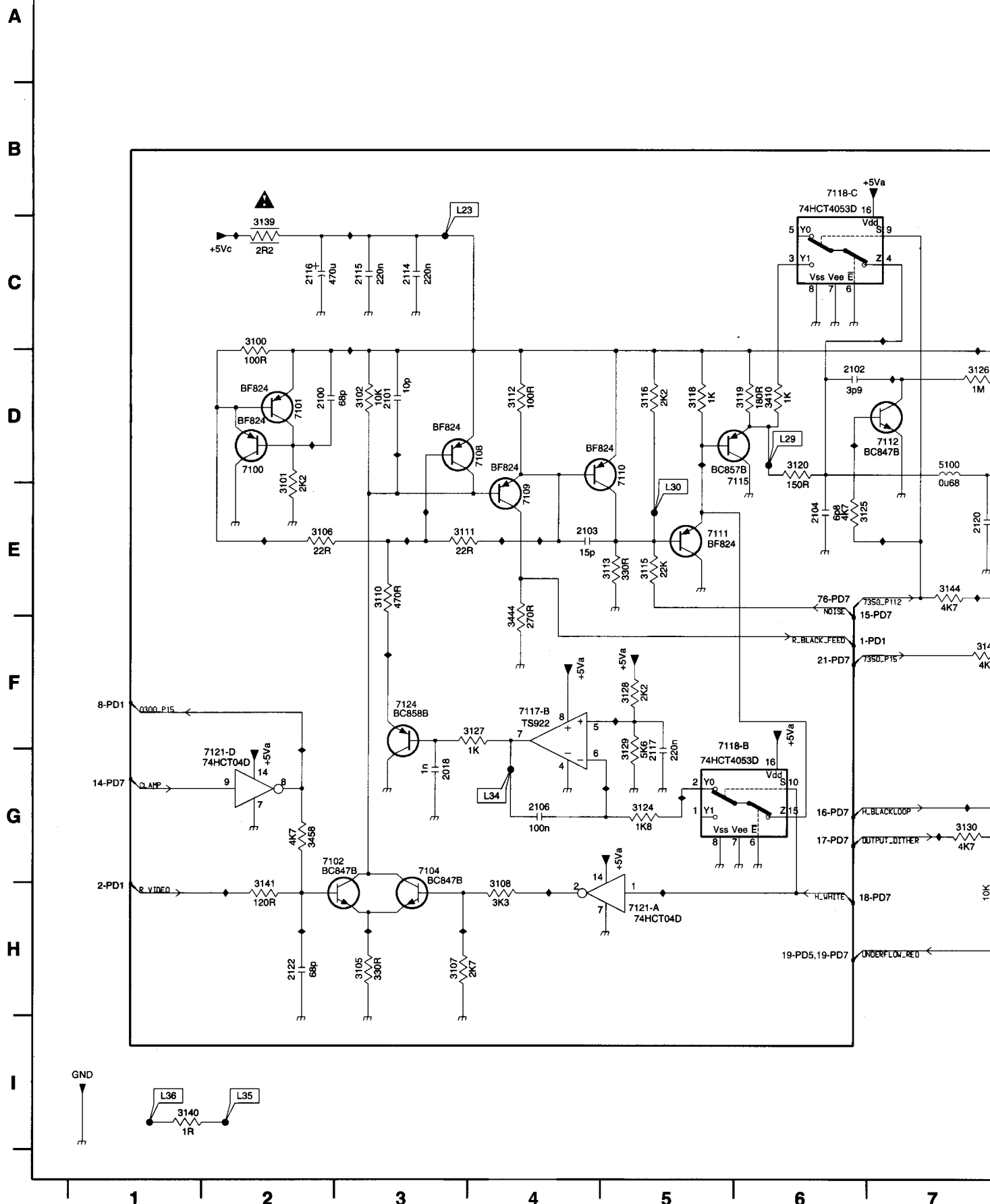


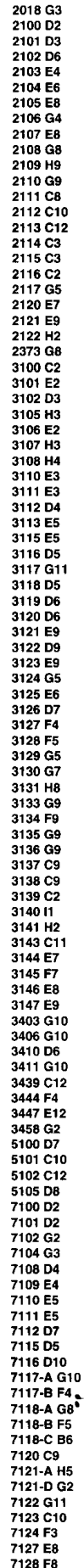
1000 E5
1001 F5
1400 E7
1401 B6
2350 D7
2351 E8
2367 C7
3360 D7
3395 D7
3398 C4
3399 D4
3400 C3
3401 E4
3402 D4
5320 D6
5321 E6
7358 B7
7363 C4
7364 D4
7365 E4



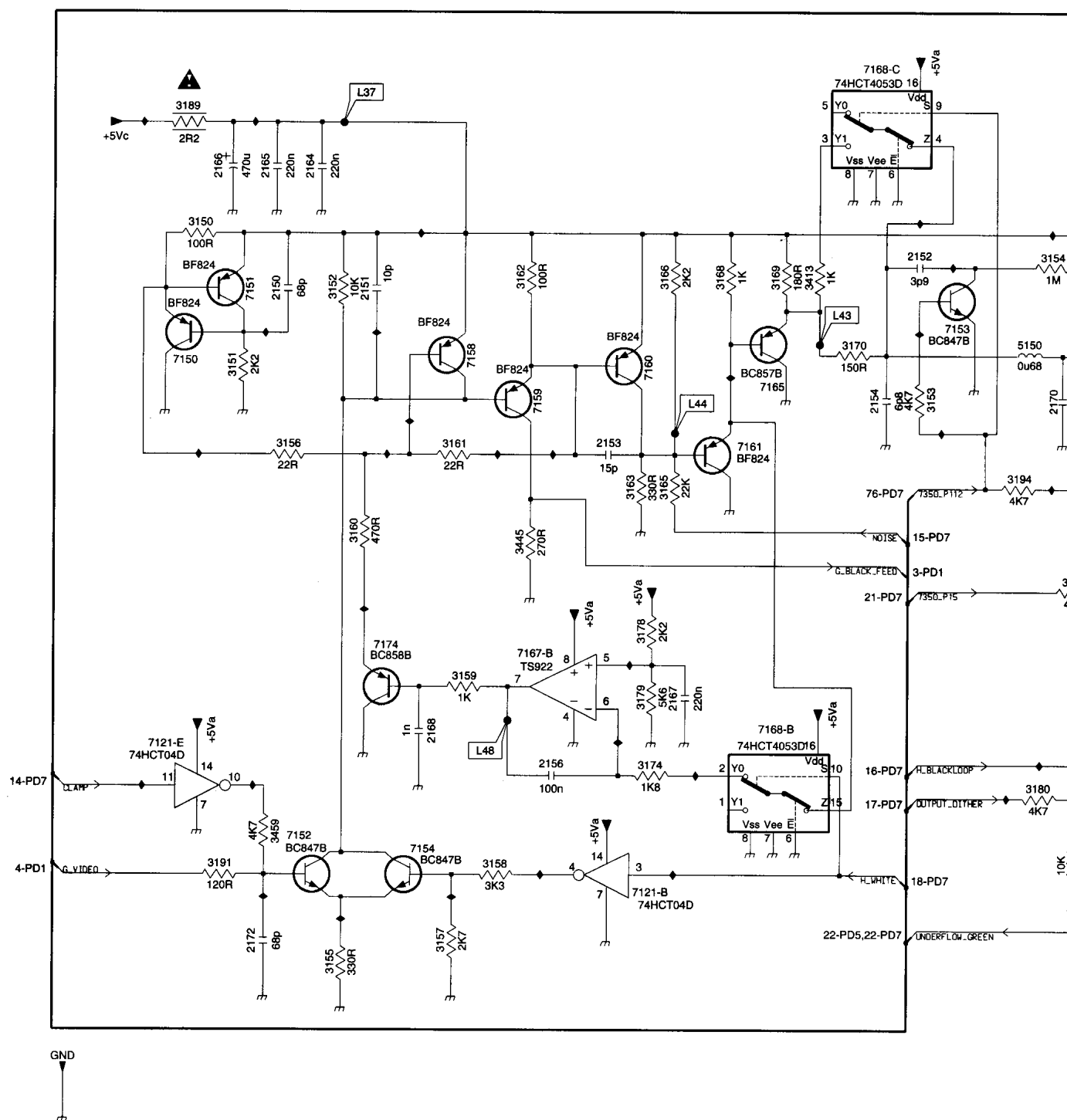
PD 2

RED GAMMA + ADC

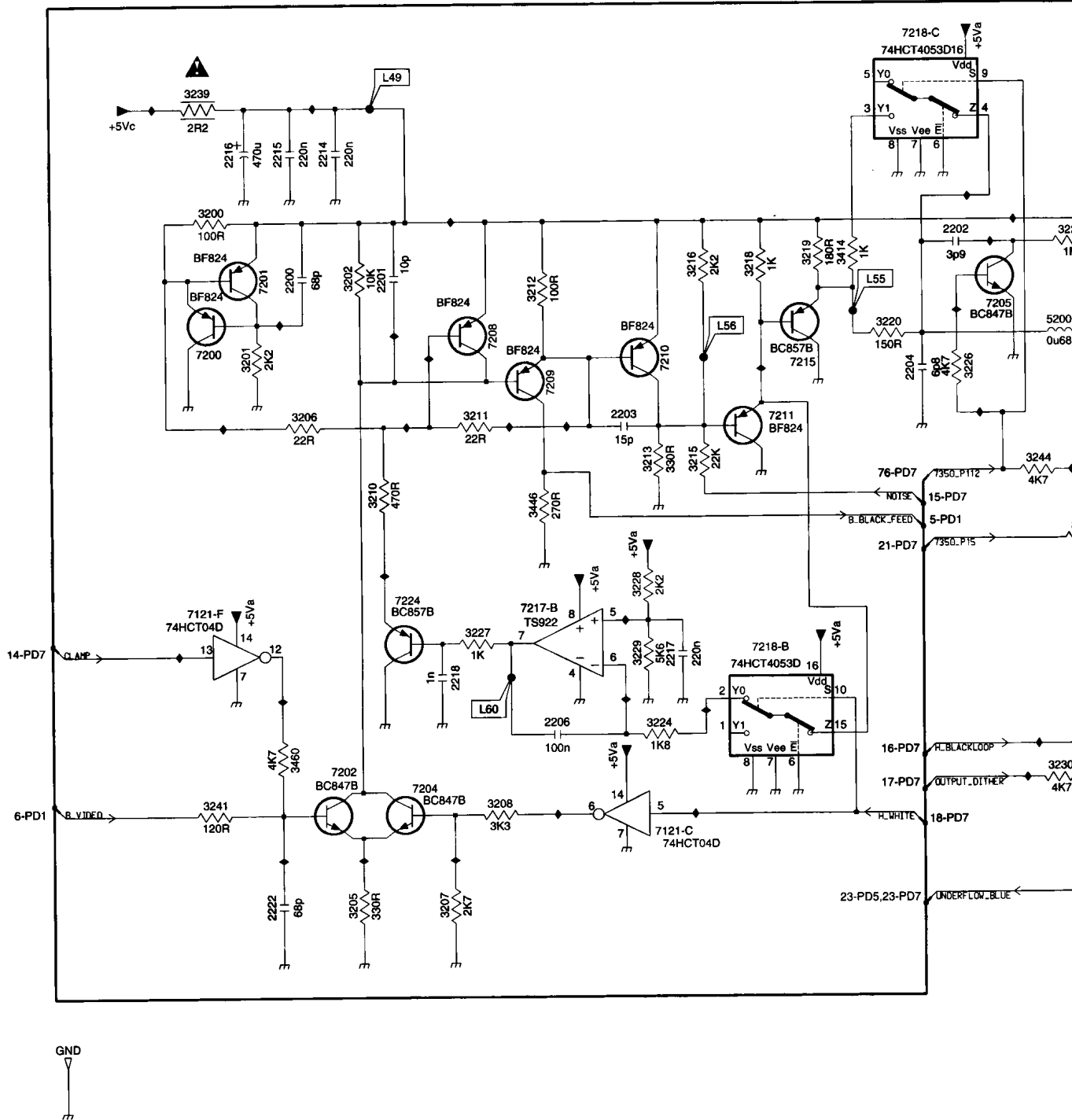




PDP limesco

PD3**GREEN GAMMA + ADC**

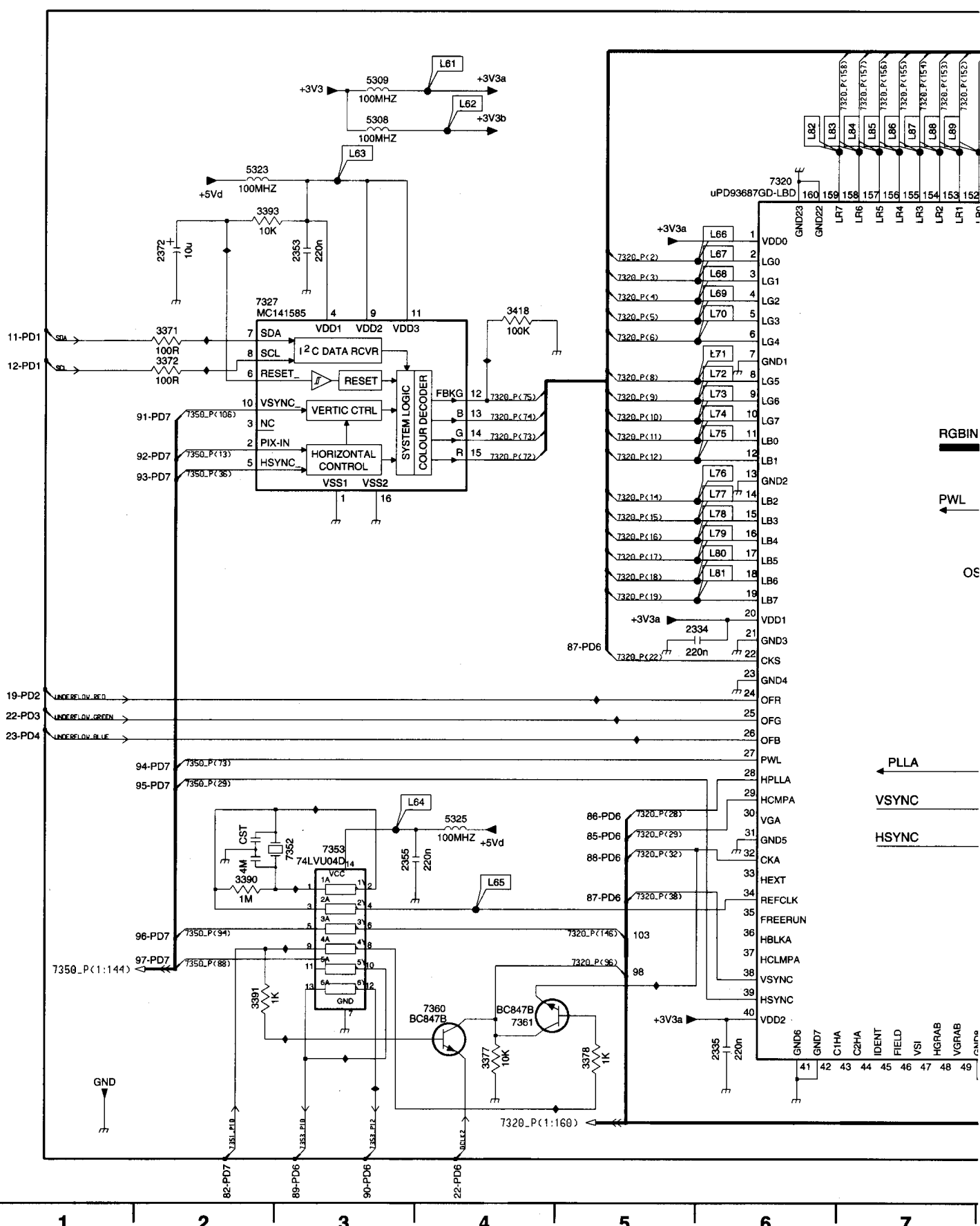
PD 4 BLUE GAMMA + ADC

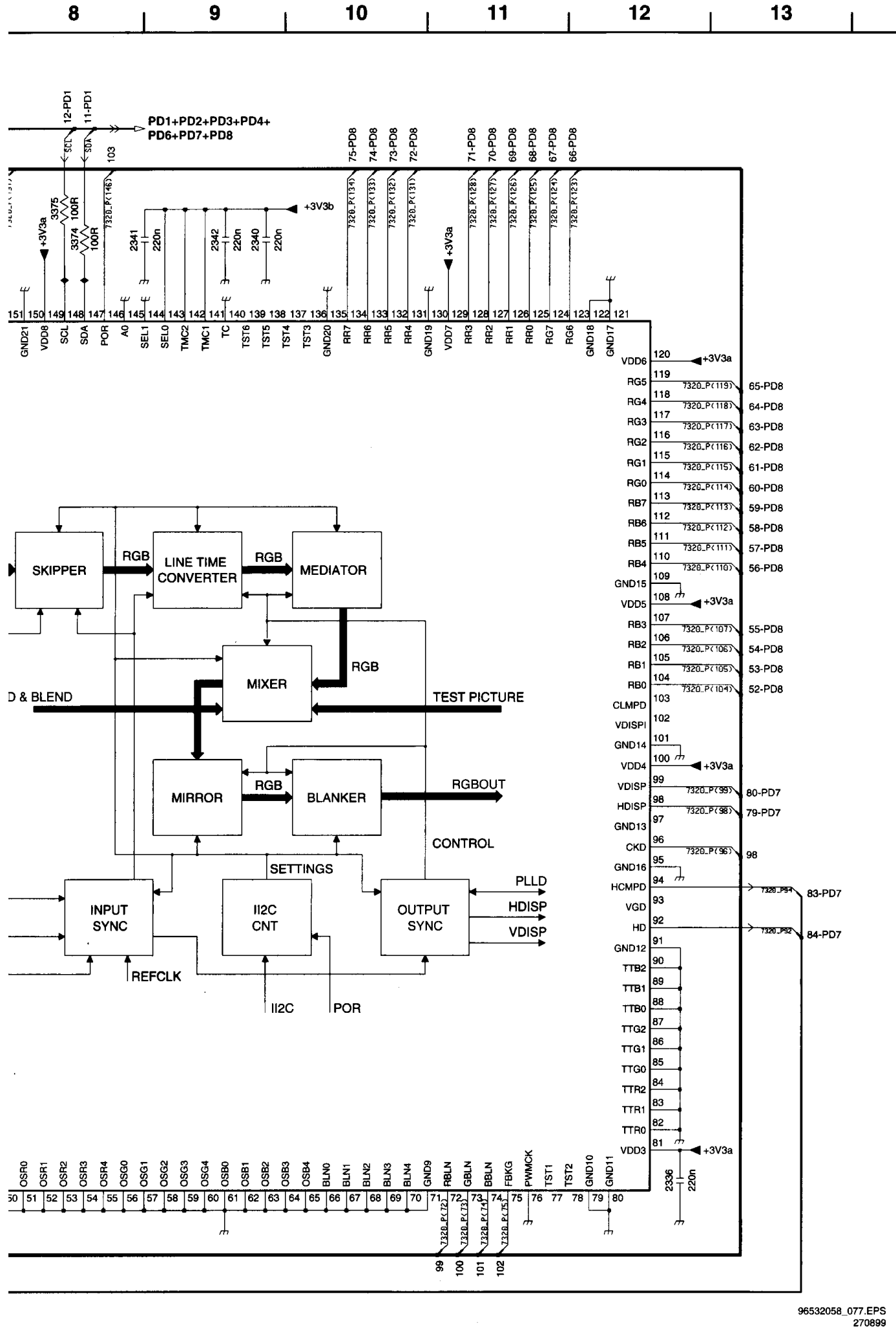




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PDF5 SCAN CONVERTER + OSD

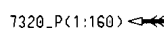


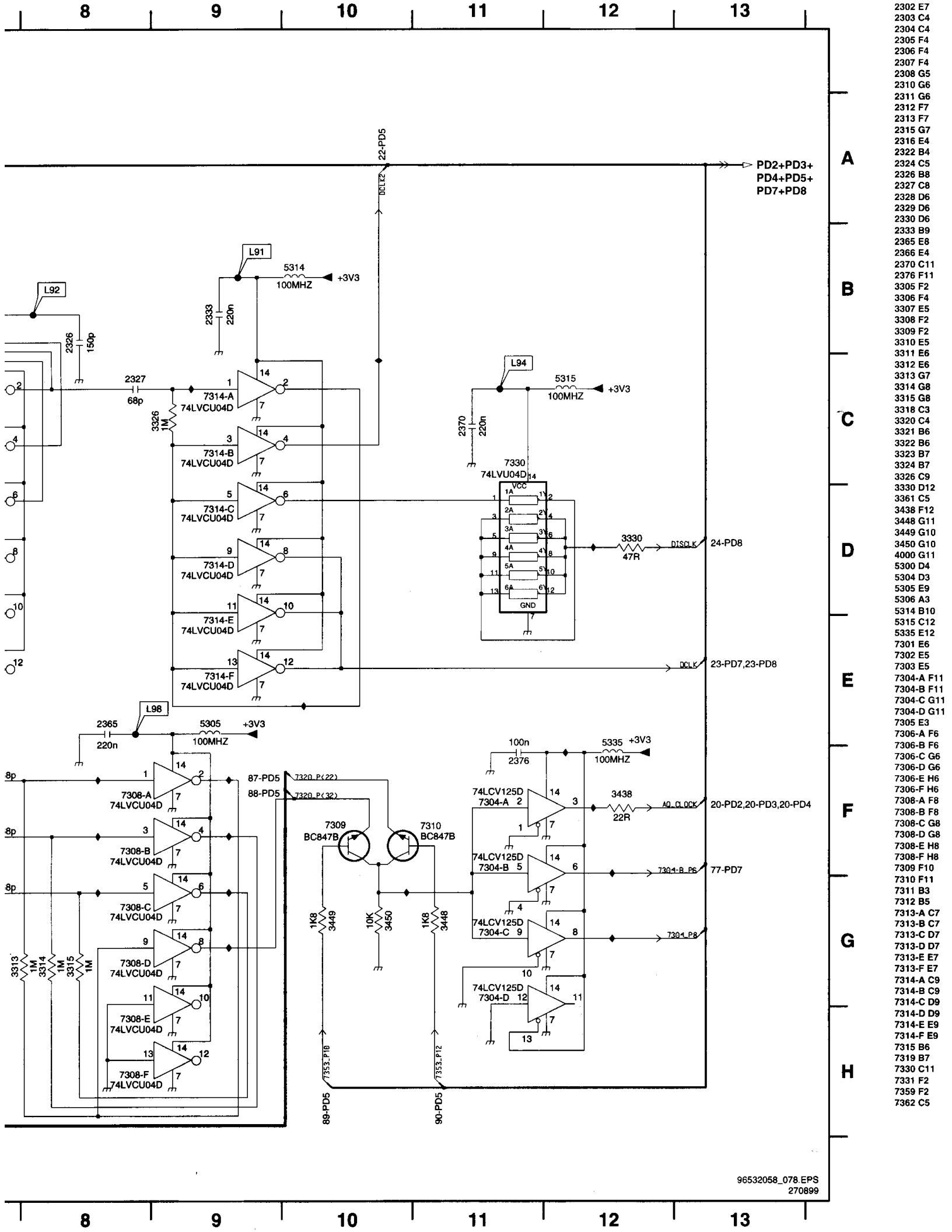


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2334 F6
2335 I6
2336 I12
2340 B9
2341 B8
2342 B9
2353 C3
2355 G3
2372 C2
2371 C2
3372 D2
3374 B8
3375 B8
3377 I4
3378 I5
3390 G2
3391 H2
3393 C2
3418 C4
5308 B3
5309 B3
5323 B2
5325 G4
7320 B6
7327 C2
7352 G3
7353 G3
7360 H4
7361 H4

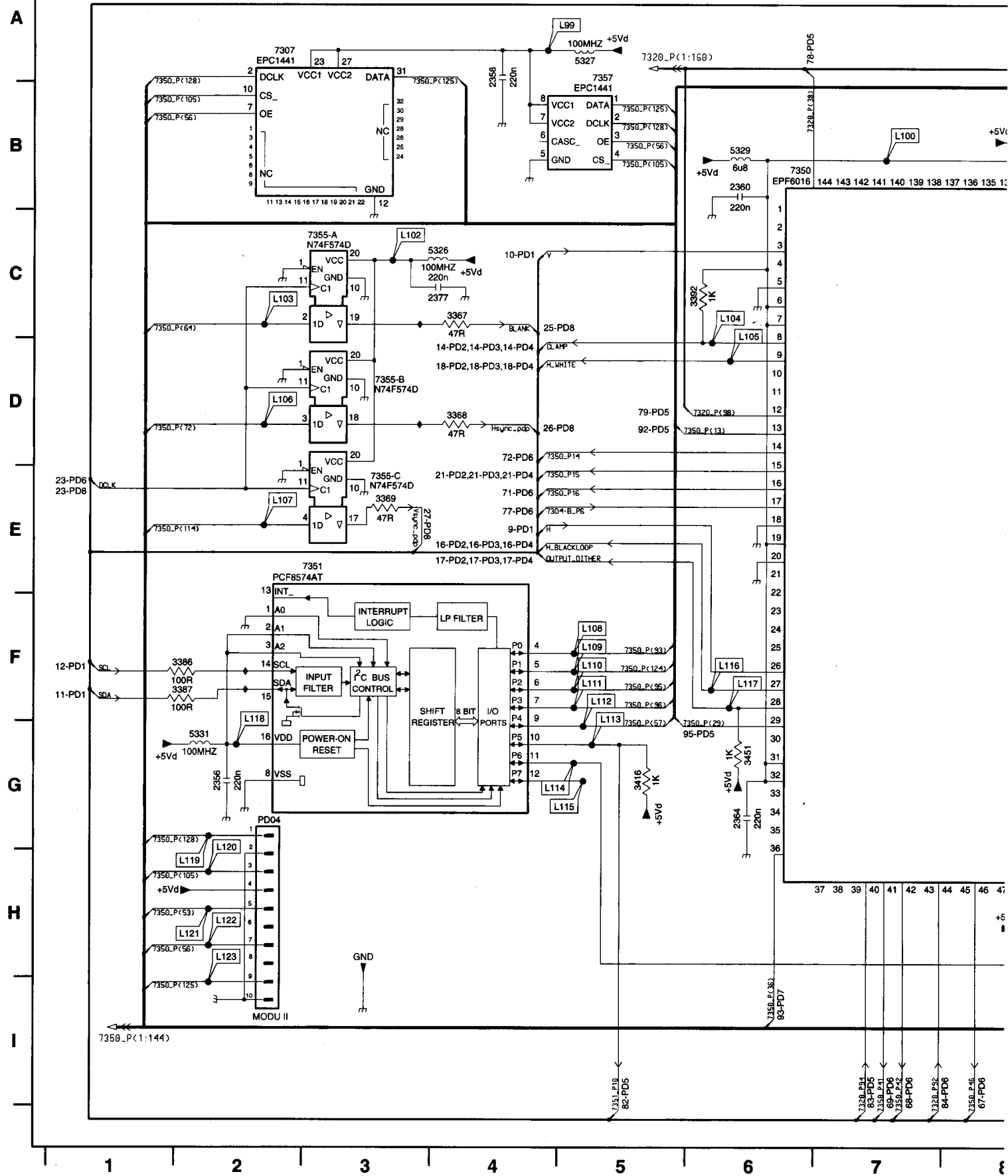
PD6 PLL'S





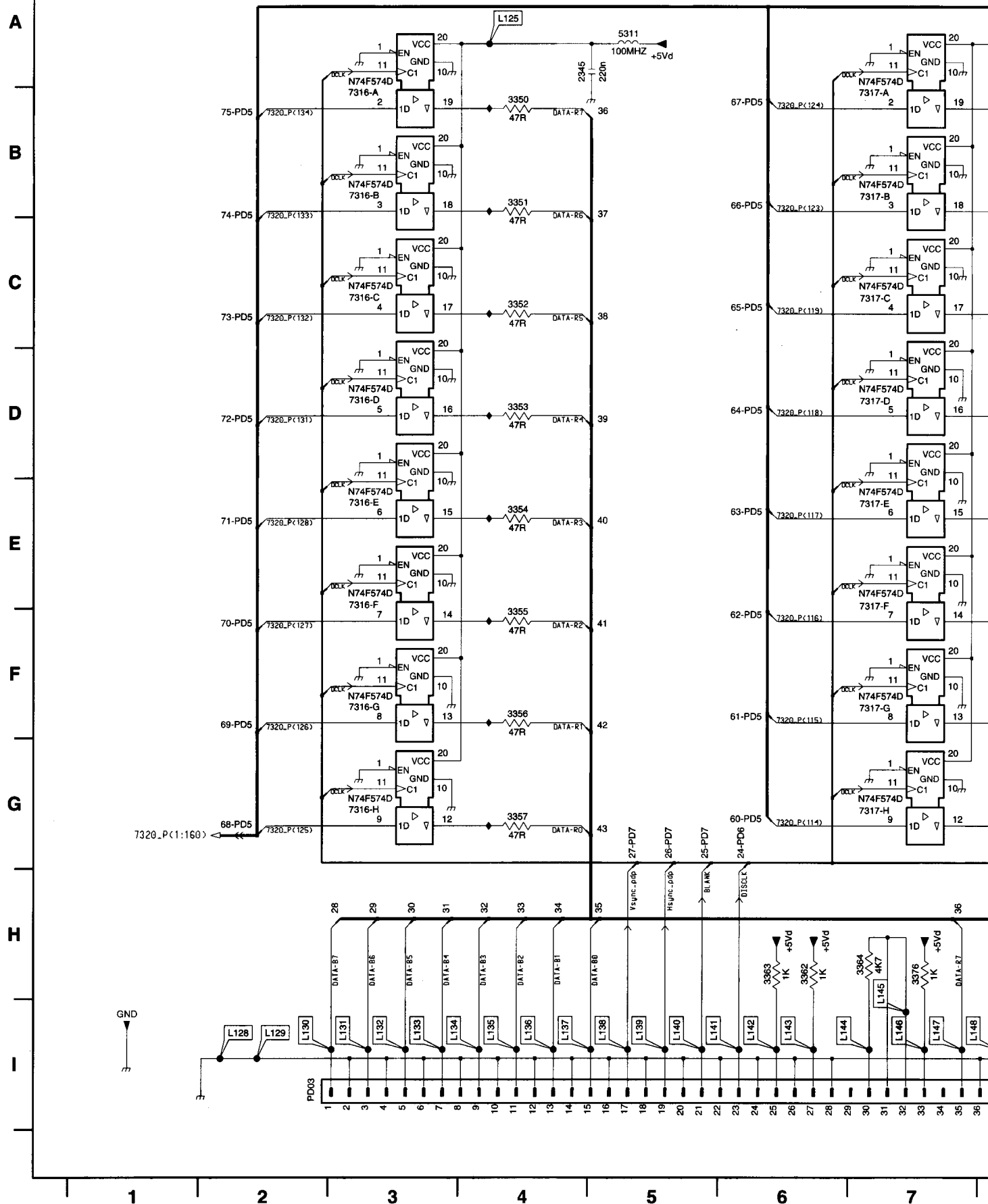
P D 7

LOGIC CONTROL + I/O

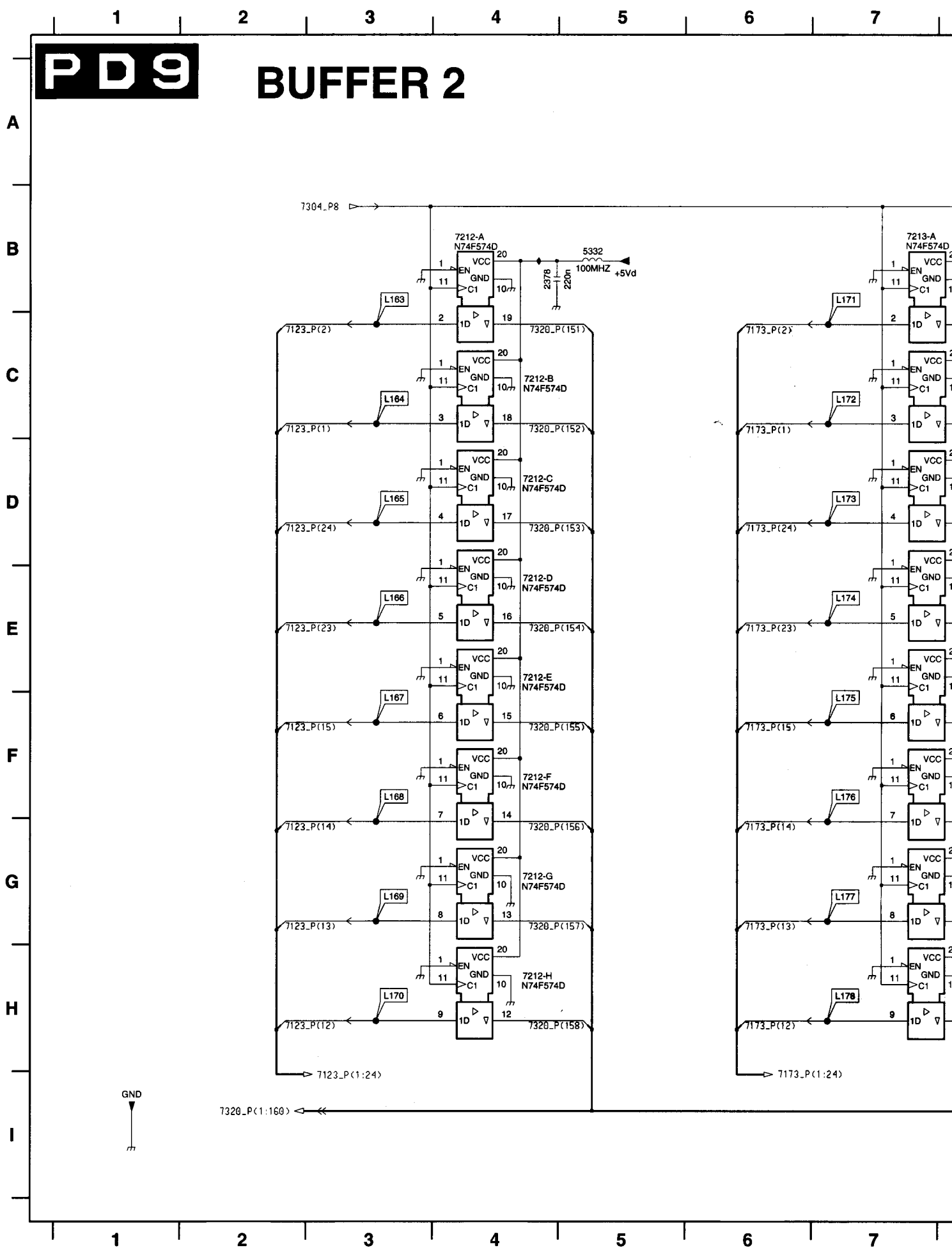




PDP limesco

PD8**OUTPUT BUFFER PDP-CONNECTC**

PDP limesco



A

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D

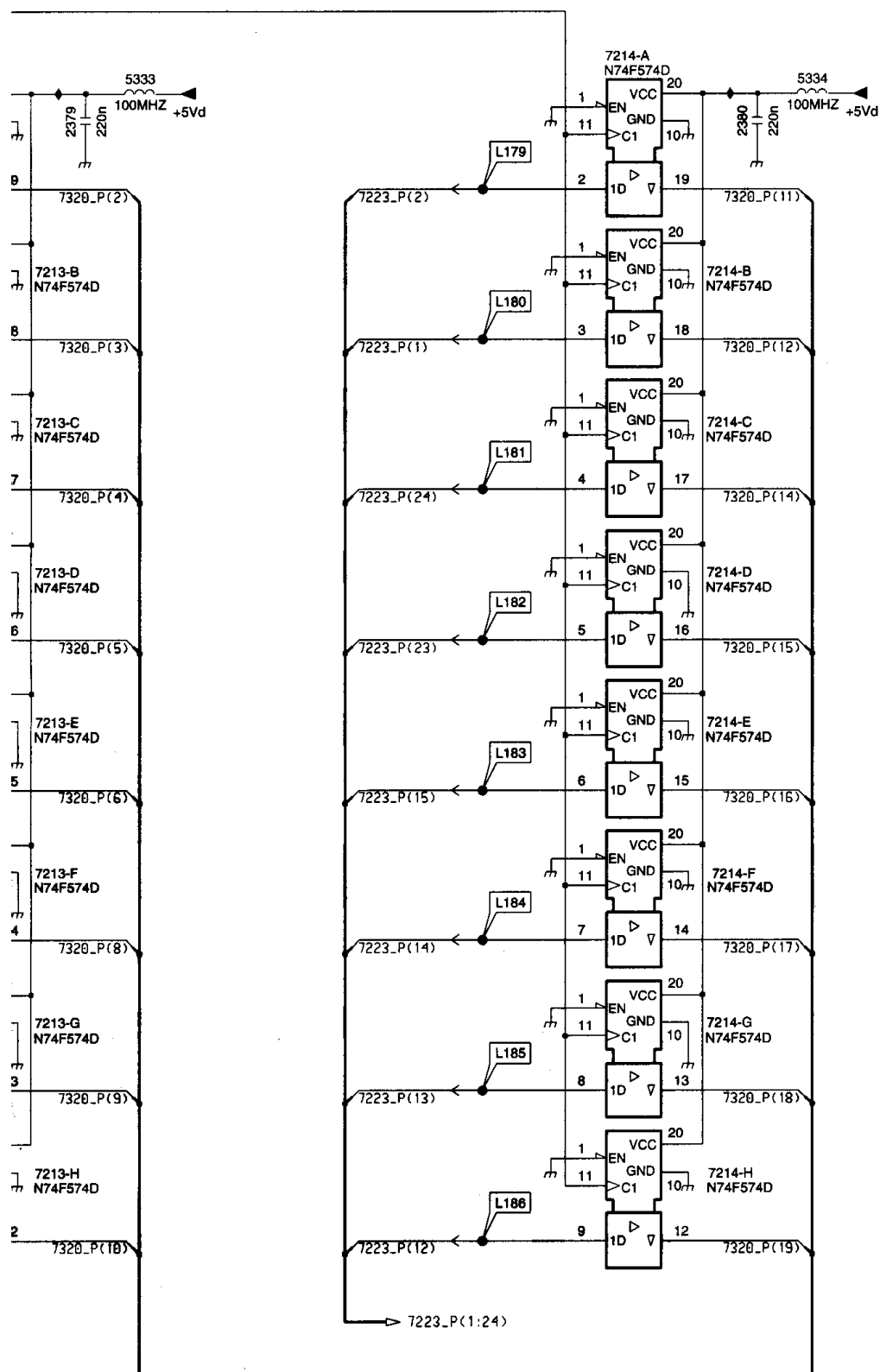
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8. Alignments

General: the Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5 'Service modes, faultfinding and repair tips'.

8.1 Alignment conditions

All electrical adjustments should be performed under the following conditions:

- Supply voltage : 220 - 240 VAC (+/- 10 %)
- Warm-up time: 10 minutes
- The voltages and oscillograms are measured in relation to the tuner earth.
- Test probe: $R_i > 10\text{M}\Omega$ $C_i < 2,5\text{ pF}$.

8.1.1 Selection of the SAM-menu

- By transmitting the "ALIGN" command with the RC7150 Dealer Service Tool, followed by password "3140" and < OK > button.
- Standard RC sequence 062596 (within OSD time-out) OSD
- By shorting test-point M28 and M29 on the AV Control panel on the monitor while switching on the set.

8.2 Adjustments on the D-box

8.2.1 Electrical Alignments

Pre-conditioner +5Vstby (PR3)

Connect a voltmeter to capacitor C2510 (PR2). With the aid of R3504 adjust the voltage to 5.2 V +/- 50 mV.

VsVa supply (FD)

Va-supply (Addressing of the PDP - FD1)

De-activated the PDP.

Connect a voltmeter to capacitor C2120 (FD1). With the aid of R3126 adjust the voltage to 55 V +/- 0.5 V.

Vs-supply (Sustain pulses - FD2)

De-activated the PDP.

Connect a voltmeter to capacitor C2020 (FD2). With the aid of R3026 adjust the voltage to 165 V +/- 0.5 V.

8.2.2 Software Alignments

White point

- Select the item "PDP test pattern" of the Service Alignment menu and set it to "ON".
- Select item " White point" of the Service Alignment menu.
- Enter the "white point" menu and adjust the value of one of the 4 submenu if necessary. Only the selected menu-item including its value remain on the screen when selected. The value has to changed within 5 seconds otherwise the main menu reappears again.

The 4 sub menu-items of the White point menu:

- "RED"
- "GREEN"
- "BLUE"
- "COLOUR TEMPERATURE"
- Leave the sub-menu by pressing "cursor up", "cursor down", "OK" or the "MenuOnOff" button and return to the main menu.
- Select the item "PDP test pattern" of the Service Alignment menu and set it to "OFF".

9. Circuit description and list of abbreviations

9.1 Circuit description

For a detailed description of the circuits see Training Manual FTV1.9 Display Box (3122 785 10036).

9.2 List of abbreviations

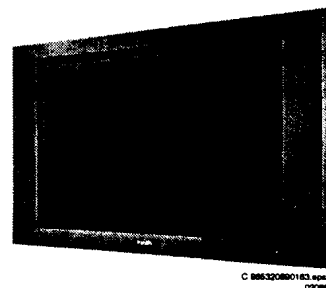
μP	Micro Processor
1FH	One time the line frequency for normal picture quality
2FH	Twice the line frequency for a better picture with less field flicker
2CS	2 Carrier Sound (sound system using two separate FM carriers at 5.5 MHz)
AARA	Automatic Aspect Ratio Adaptation
ADC	Analogue Digital Converter
ADJ	Adjust -
AFC	(S1) Automatic Frequency Control. Automatic fine-tuning circuit for signal reception.
AGC	Automatic Gain Control
AM	Amplitude Modulation
AMV	Automatic Multi Voltage
ANT	Antenna
AP	Asian Pacific region (Covering Hong Kong, Australia, Singapore etc.)
APC	Automatic Power Control
ASP	Aspect Ratio 4:3 or 14:9 or 16:9
AUD	Audio - GFL
AVB	Audio Video Buffer or Audio Video Blanking
BC	Beam current - GFL
BNC	Professional connector for higher frequencies
C	Centre
CINCH	Common connector for several kinds of signals
COMP	COMB-filter
CRT	Cathode Ray Tube
CVBS	Composite Video Blanking Synchronisation, video signal
DAC	Digital Analogue Converter
DEC	Decoder
DFB	Double Window Fast Blanking
DU	Double Window - U_signal
DV	Double Window - V_signal
DW	Double Window
DY	Double Window - Y_signal
E-Box	Electronic Box
EHT	Extra High Tension - GFL
ELPS	Eco Low Power Supply - GFL
EWD	East West Drive - GFL
EXT	External
FBL	Fast Blinking
FBX	Feature Box
FE	FrontEnd
FM	Frequency Modulation
FMS	Functional Module Specification
FRNT	Front
FRS	Functional Requirement Specification
FTV	Flat TeleVision
GFL	Global Feature Line (high end TV chassis)
GFL-FL	GFL Feature (up)Lift
GND	Ground
HFB	Horizontal FlyBack (display system sync. pulse)
HP	Headphone

HSI	Hardware Software Interface
HW	HardWare
I/O	Input / Output
I2C	IC bus, Inter Integrated circuit, on-board communication line
IF	Intermediate Frequency
IRQ	Interrupt ReQuest.
L	Left
L_CL VL	Left_Constant_Level Variable_Level
L_REC SEL	Left_Record_Select
LED	Light Emitting Diode
LP	Low Pass
LTP	Luminance Transient Processor
MAC	(Apple) MACintosh
MAC13	or MACII (Apple) MACintosh format for 13" monitors
MACP	Motion Adaptive Colour Plus
ML-2	Media Line 2
Monitor	PDP Display with all the electronic boards (incl. self developed boards).
MU	Main U_signal
MV	Main V_signal
MY	Main Y_signal
NICAM	Near Instantaneous Companding Audio Multiplex (digital terrestrial sound)
NTSC	National TV Standard Committee
OE	(AQ) Output Enable
PAL	Phase Alternating Lines (Colour video standard)
PDP	Plasma Display Panel
PIP	Picture In Picture
PLL	Phase Locked Loop
POR	Power On Reset / Power Off Reset (depending on context)
QPSK	Quadruple Phase Shift Keying
R	Right
RAM	Random Access Memory
RC5	Remote Control 5 (infrared signal transmission protocol)
RECEI-RC5	Received RC5-code
REF	Reference
RES	Resistor
RGB	Red Green Blue, video signals
SC-1FH	Sandcastle 1FH
SCL	Serial Clock Line of the IC bus
SDA	Serial Data Line of the IC bus
SECAM	SEquential Couleour A Memoire (Colour video standard)
SIF	Second Intermediate frequency
SND	Sound
SOG	Sync On Green
SP_GAIN	Splitter GAIN
SPHsync	Splitter Horizontal Sync
SPVsync	Splitter Vertical Sync
SSP	Small Signal Panel (of the GFL chassis)
STBY	Standby
SW	SoftWare / SubWoofer (depending on context)
SYNC	Synchronisation
SYS	System
Terr	Terrestrial
TP	Testpoint
TRASN	(AQ)
TSD	Terrestrial Sound Decoder (combination of 2CS and NICAM decoder)
TUN	Tuner

TXT	TeleteXT
TXT-KILL	Teletext killer (Signal to disable Teletext)
U-VIDCONTR	U-VideoContrast
VCO	Voltage Controlled Oscillator
VD	Vertical Drive
VGA	Video Graphics Array. In this document, the term VGA is used for all VGA
WE	Write Enable
Xtal	Crystal (Oscillator)
Y/C	Luminance (Y) signal / Chrominance signal (C)
YUV	Combination of colour difference signals

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Service Manual

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PROVISIONAL

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PHILIPS

1. Technical specifications

1.1 Technical data D-box

Mains voltage	: 110 - 240 Vac; (- 15 % , + 10 %)
	: 50 Hz - 60 Hz
Power dissipation	: 400W
Stand-by dissipation	: < 1W

1.2 Connection facilities

1.2.1 Specification of the terminal sockets

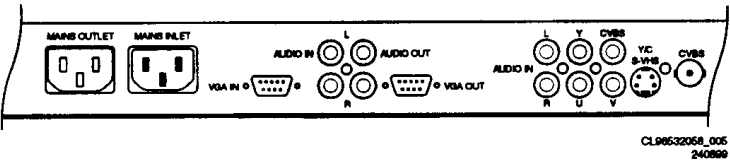


Figure 1-1

VGA-in

- 1 - R (0.7 Vpp 75 Ω)
- 2 - G (0.7 Vpp 75 Ω)
- 3 - B (0.7 Vpp 75 Ω)
- 4 - Reserved
- 5 - Bus-gnd
- 6 - R-gnd
- 7 - G-gnd
- 8 - B-gnd
- 9 - RC5
- 10- GND
- 11-

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- 12- Bus1 (TxD/ Rxd or SDA)
- 13- Hsync
- 14- Vsync
- 15- Bus2 (TxD/ RxD or SDA)

VGA-out

- 1 - R (0.7 Vpp 75 Ω)
- 2 - G (0.7 Vpp 75 Ω)
- 3 - B (0.7 Vpp 75 Ω)
- 4 - Reserved
- 5 - gnd
- 6 - R-gnd
- 7 - G-gnd
- 8 - B-gnd
- 9 - Reserved
- 10- GND
- 11- Reserved
- 12- Reserved
- 13- Hsync
- 14- Vsync
- 15- Reserved

Audio VGA-in

- Cinch Audio L(0.5 Vrms >= 10 k)
- Cinch Audio R(0.5 Vrms >= 10 kΩ)

Audio VGA-out

- Cinch Audio L(0.5 Vrms >= 1 k)
- Cinch Audio R(0.5 Vrms >= 1 kΩ)

SVHS

- 1 - GND
- 2 - GND
- 3 - Y (1 Vpp / 75)
- 4 - C (0.3 Vpp / 75)

Audio In:

- Cinch Audio L (0.5 Vrms >= 10 k)
- Cinch Audio R (0.5 Vrms >= 10 kΩ)

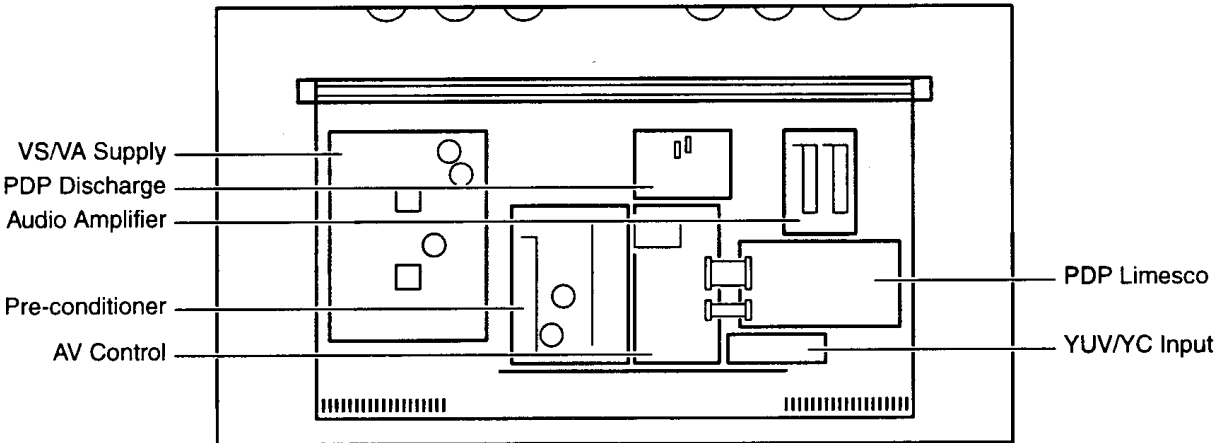
CVBS

- BNC - CVBS (1 Vpp / 75 Ω)

YUV

- Y (1 Vpp / 75)
- 3 - U (1 Vpp / 75)
- 4 - V (1 Vpp / 75)

1.3 Chassis overview



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Figure 1-2

2. Safety instructions, warnings and notes

2.1 Safety instructions ▲

It is not allowed to operate the FTV-set without glass plate. One function of this glass plate is to absorb Infrared Radiation. Without this glass plate the level of Infrared Radiation produced by the plasma display could damage your eyes.

1. Safety regulations require that during a repair:
 - the set should be connected to the mains via an isolating transformer (in this particular case a transformer of ≥ 800 VA);
 - safety components, indicated by the symbol ▲ , should be replaced by components identical to the original ones;
2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
 - Note: The wire trees should be routed correctly and fixed with the mounted cable clamps.
 - The insulation of the mains lead should be checked for external damage.
 - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets that have a mains isolated power supply). This check can be done as follows:
 - unplug the mains cord and connect a wire between the two pins of the mains plug;
 - set the mains switch to the on position (keep the mains cord unplugged!);
 - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between $4.5\text{ M}\Omega$ and $12\text{ M}\Omega$;
 - switch off the TV and remove the wire between the two pins of the mains plug.
 - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

4. If DST reacts with 'error 2', there is no communication between set and DST. Note that IR-transmitter LED is positioned at right side of IR-receiver eye of the E-box. Take into account that receiver-LED on DST is positioned not in the middle but at the left side. Point corresponding LED's to each other. In case the amount of Infrared produced by the screen pollutes the communication, the set can be set in Standby-mode. Then still the error-messages can be retrieved.

2.2 Warnings

1. ESD ▲

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ▲). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.

1. Available ESD protection equipment:
 - complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
 - wristband tester 4822 344 13999
2. Never replace modules or other components while the unit is switched on.
3. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

1. A glass plate is positioned before the plasma display. This glass plate can be cleaned with a slightly humid cloth. If due to circumstances there is some dirt between the glass plate and the plasma display panel it is recommended to do some maintenance by a qualified service employee only.
2. Never disconnect the power display cable when the set is operating
3. With DST no failures (error-codes) can be read, when the set is in Service-mode.

4. Mechanical instructions

4.1 Introduction:

There are pre-defined service positions for the following panels:

1. VS/VA SUPPLY panel.
2. PDP DISCHARGE panel.
3. AUDIO AMPLIFIER panel.
4. PRE-CONDITIONER panel.
5. AV CONTROL panel.
6. PDP LIMESCO panel.
7. YUV/YC INPUT panel.
8. LED DISPLAY panel.
9. SWITCH DISPLAY panel.

Before these panels can be accessed, the rear cover has to be removed:

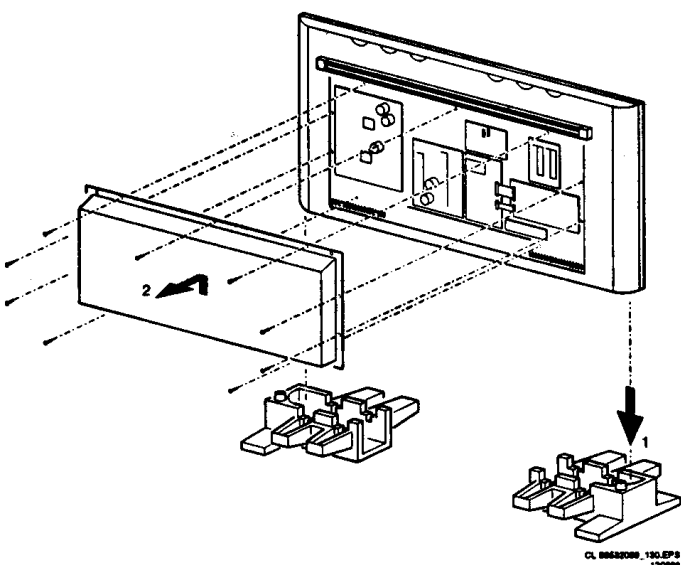


Figure 4-1

1. Place the Display Box in the service stand via 2 reinforced cushions (order code: 3122 126 ?????).
2. Remove the 9 fixation screws of the rear cover.
3. Remove the rear cover (during removal push it slightly upwards).

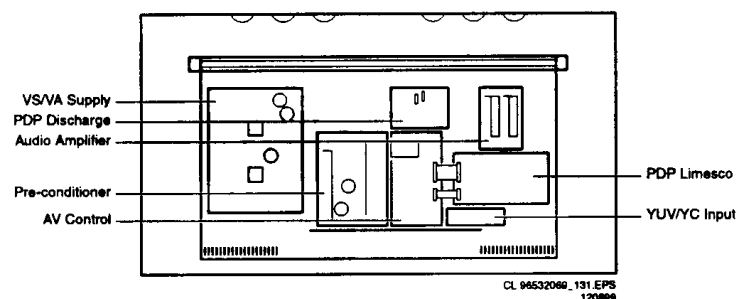


Figure 4-2

1. All panels are now accessible.

4.1.1 VS/VA SUPPLY panel.

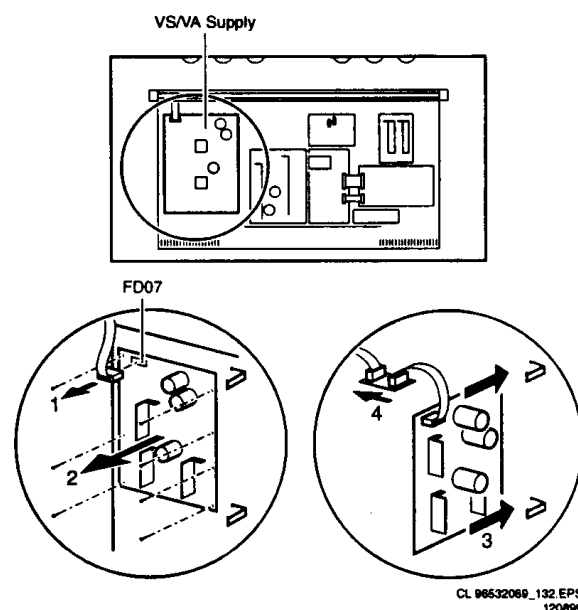


Figure 4-3

1. Disconnect Fan Supply cable from connector FD07 in the upper left corner [1].
2. Remove the 7 fixation screws of the panel [2].
3. Place panel on the 2 hinges, which are located near the right corners of the panel [3].
4. Use the mechanical service part (extension cable assembly, 12NC: 3122 785 90006) to extend the Fan Supply cable [4].
5. The copper side is now accessible from the left.

4.1.2 PDP DISCHARGE panel.

As in the FTV 1.5, this panel must be exchanged completely i defective.

4.1.3 AUDIO AMPLIFIER panel.

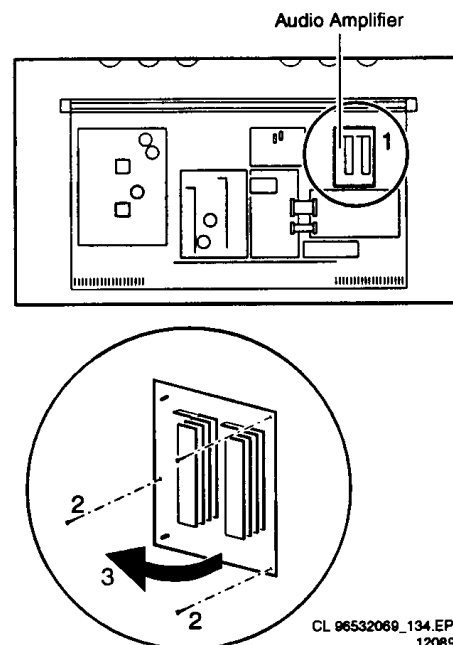


Figure 4-4

1. Some testpoints are accessible at the B-side [1].
2. If this is not sufficient, remove the 3 fixation screws of the panel [2].
3. Panel now can be hinged on the left side to access the A-side (soldering side) [3].

4.1.4 PRECONDITIONER panel.

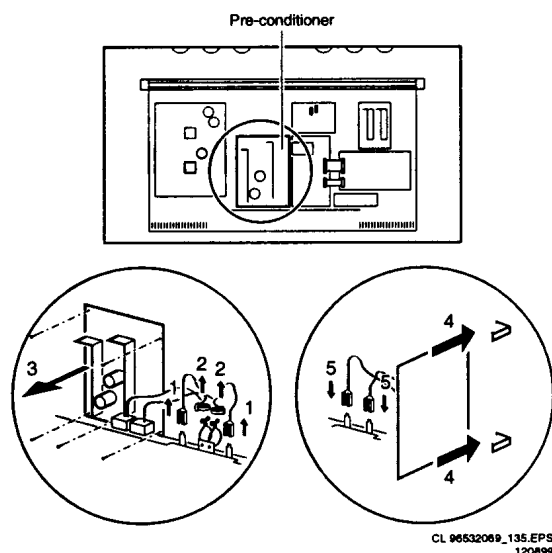


Figure 4-5

1. Disconnect the 2 grounding wires from the shielding plate by pressing the small lever on the connector while pulling [1].
2. Remove the 2 ferrite ring cores from their fixations [2].
3. Remove the 5 fixation screws of the panel [3].
4. Place panel on the 2 hinges, which are located, near the left corners of the panel [4].
5. Reconnect grounding wires to the extra connectors on the shielding plate at the left side [5].
6. The copperside becomes accessible now from the right side.

4.1.5 AUDIO VIDEO CONTROL panel.

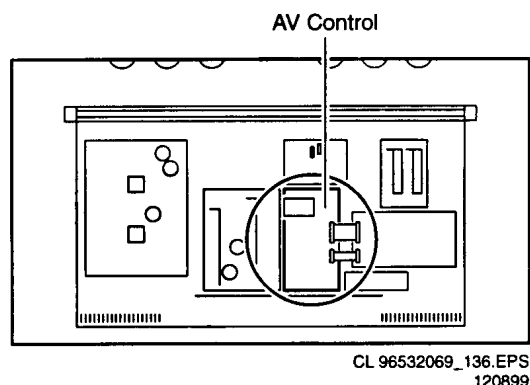


Figure 4-6

This panel has no service position for accessing the A-side, however all service test points are accessible at the B-side (see Service Manual).

In case some components must be (de)soldered, all fixation screws (6 for the panel, 5 at the metal connector plate) and all cables must be removed to access the A-side.

4.1.6 PDP LIMESCO panel.

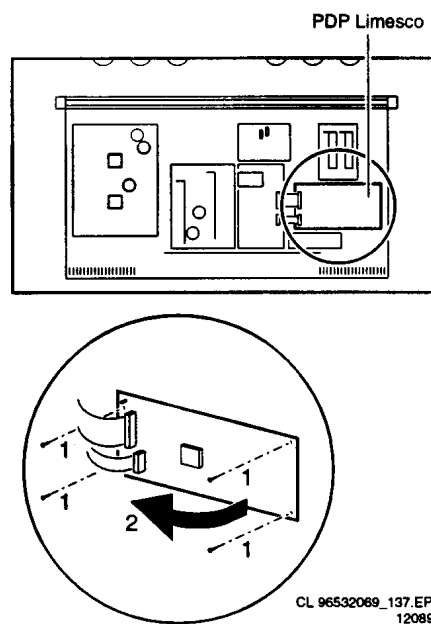


Figure 4-7

All SMC's are located on the B-side, so all testpoints are accessible. In case some components must be (de)soldered, the hinge construction can be used to access the A-side.

1. Remove the 4 fixation screws of the panel [1].
2. Panel can now be hinged to access soldering side [2].

4.1.7 YUV/YC INPUT panel.

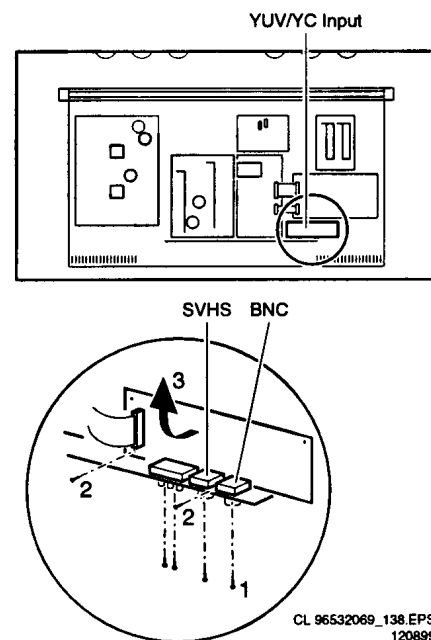


Figure 4-8

This panel has no pre-defined service position. For access of the A-side, the panel has to be removed:

1. Remove the 4 screws at the metal connector plate [1].
2. Remove the 2 fixation screws of the panel [2].
3. Panel can be removed now to access the A-side [3].

4.1.8 LED DISPLAY panel.

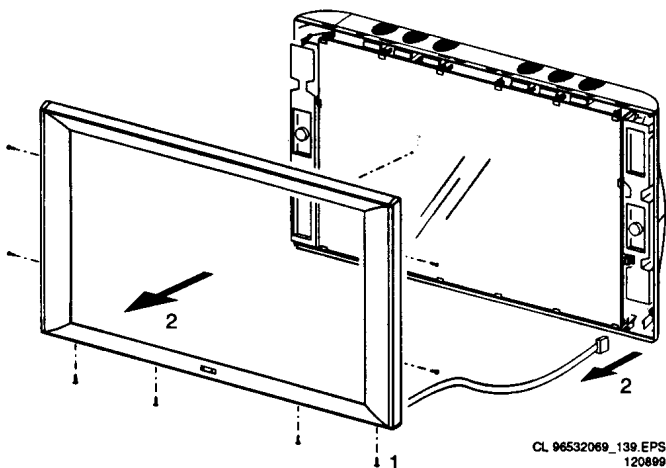


Figure 4-9

1. Remove 2 x 2 screws at the sides and 4 screws at the bottom of the front cover [1].
2. Remove the front cover (it hinges at the top). During removal unplug the cable of the LED DISPLAY panel at the SWITCH DISPLAY panel (connector SD11) [2].

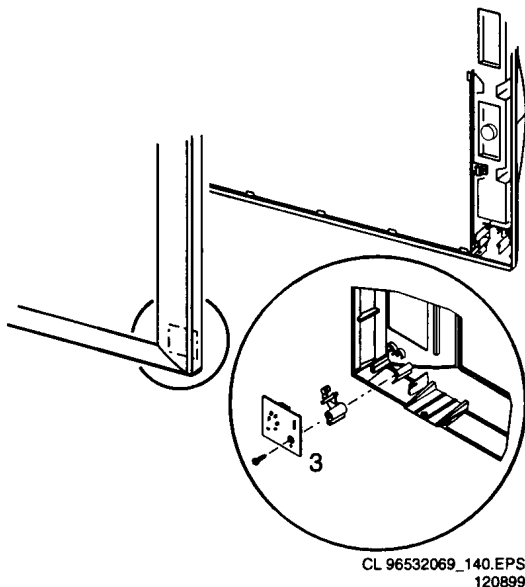


Figure 4-10

1. The LED DISPLAY panel can be removed now by unscrewing 1 fixation screw [3].

4.1.9 SWITCH DISPLAY panel.

1. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

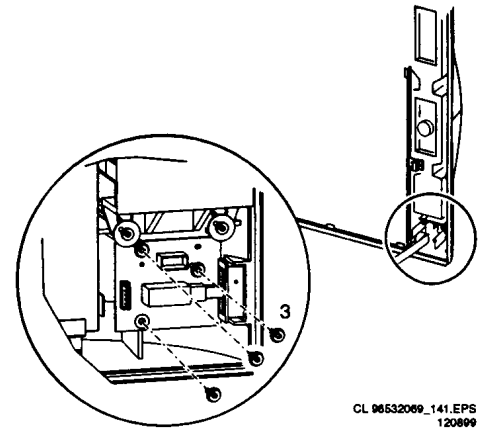


Figure 4-11

1. The SWITCH DISPLAY panel can be removed now by unscrewing 3 fixation screws [3].

4.2 Exchanging parts

Some parts of the FTV1.9 Display Box must be exchanged if defective:

1. GLASS PLATE.
2. LOUDSPEAKER.
3. PLASMA DISPLAY PANEL [PDP].

4.2.1 Exchanging of the GLASS PLATE.

1. First unplug (remove Mains and VGA cable) the Display Box .
2. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

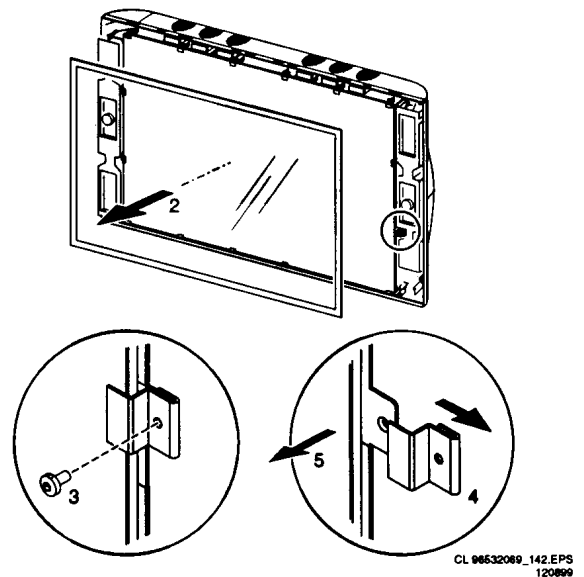


Figure 4-12

1. Now the GLASS PLATE can be removed by unscrewing a screws [3] and removing all glass clips [4].

4.2.2 Exchanging of a LOUDSPEAKER.

1. First unplug (remove Mains and VGA cable) the Display Box.
2. Remove front cover (for a description see Chapter 1.1.8 'LED DISPLAY panel').

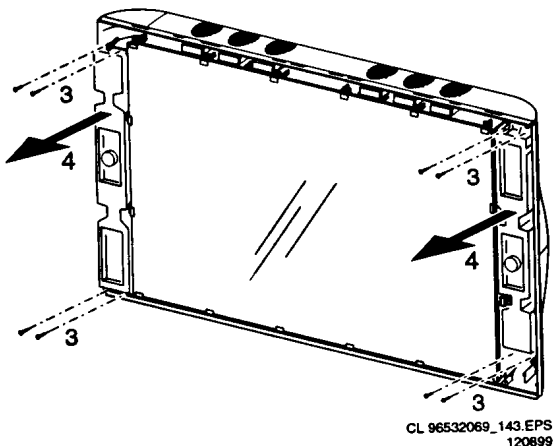


Figure 4-13

1. The LOUDSPEAKER can now be removed by disconnecting its cable and removing the 4 fixation screws at the top and bottom of the speakerbox. Be sure to remove the correct screws, otherwise the speaker system will be damaged (it is an airtight system).

4.2.3 Exchanging of the PDP.

1. First unplug (remove Mains and VGA cable) the Display Box.
2. Place the rear side of the Display Box on a foam cushion (be sure the metal rear cover is mounted in order to prevent damaging of the electronic panels).
3. Remove front cover (for a description see Chapter 1.1.8 LED DISPLAY panel).
4. Now the GLASS PLATE can be removed by unscrewing all screws and removing all glass clips (for a description see Chapter 1.2.1. 'Exchanging of the GLASS PLATE').

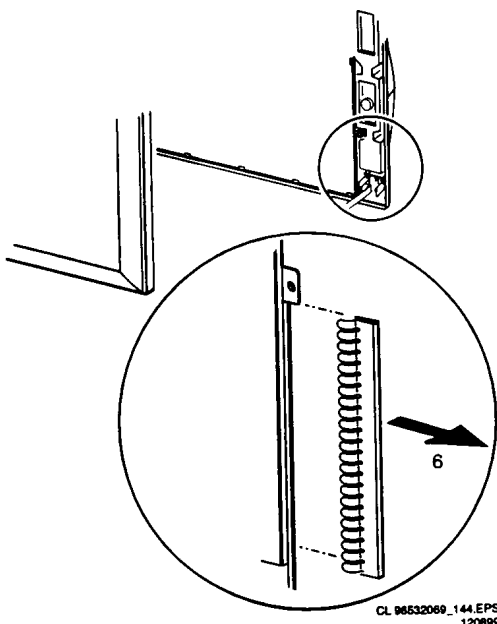


Figure 4-14

1. Remove all copper EMC SHIELDING springs mounted around the display [6].
2. Now flip the complete Display Box and place it with the Plasma Display down on a foam cushion. Be 100 % sure a large foam cushion is placed underneath the PDP, as it will drop about 10 mm after removing its fixation screws !!
3. Disassemble metal rear cover (for a description see Chapter 1.1 'Introduction').

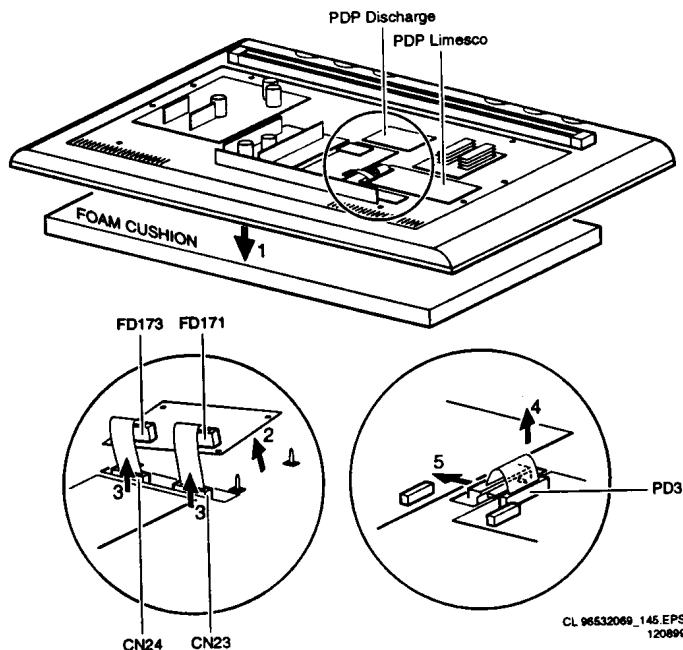


Figure 4-15

1. Disconnect the following cables:
 - Cables coming from connectors CN23 and CN24 of the PDP DISPLAY panel [3] (for easiest access lift the PDP DISCHARGE panel from its fixations [2]).
 - Flat cable on connector PD3 of the PDP LIMESCO panel [4]. Also remove the ferrite 'flat cable shield' completely by unlocking its fixations [5].

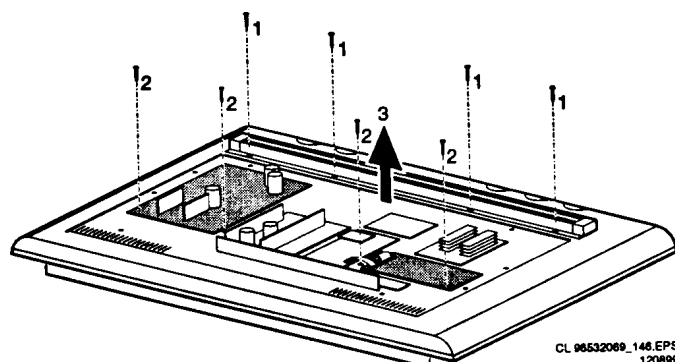


Figure 4-16

1. Now remove the 8 large screws which hold the PDP:
 - 4 screws are located at the top: they also hold the aluminium wall mount [1].
 - The other 4 are located at the bottom: the 2 outer screws are hidden behind panels. Therefore unscrew the VS/VA SUPPLY and the PDP-LIMESCO panel (grey panels) [2].
2. Lift encasing from PDP and replace PDP [3].

5. Service modes, fault finding and repair tips

For the FTV1.9, the Monitor can be used in two applications.

- A stand-alone configuration, a separate device which can also be sold and serviced separately.
- TV configuration, where the monitor is combined with the E-box.

The monitor, as a stand-alone unit, can be serviced by using a test pattern coming from the PDP-LIMESCO panel on the rear of the monitor itself or via a PC/laptop by using ComPair via the ComPair connector.

In this chapter the following paragraphs are included:

1. Test points
2. Dealer Service Tool (DST)
3. Service Modes
4. Error code buffer and error codes
5. The "blinking LED" procedure
6. Fault-finding tips
7. ComPair

5.1 Test points

The FTV1.9 chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- A1-A2-A3, etc.: Test points for the Audio amplifier (A)
- C1-C2-C3, etc.: Test points for the AV control circuit (AVC)
- FD1-FD2-FD3, etc.: Test points for the VsVa supply (FD1-FD2) and the PDP discharge panel
- L1-L2-L3, etc.: Test points for the PDP LIMESCO (PD1-PD9)
- PR1-PR2-PR3, etc.: Test points for the Pre-conditioner (PR1-PR3)
- Y1-Y2-Y3, etc.: Test points for the Y/C YUV monitor panel (UY1-YC4)

Measurements are performed under the following conditions:

Video: colour bar signal; Audio: 3 kHz left, 1 kHz right

5.2 Dealer Service Tool (DST)

For easy installation and diagnosis the dealer service tool (DST) RC7150 can be used. When there is no picture (to access the error code buffer via the OSD), DST can enable the functionality of displaying the contents of the entire error code buffer via the blinking LED procedure, see also paragraph 5.5. The ordering number of the DST (RC7150) is 4822 218 21232.

5.2.1 Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with pre-sets. 10 Different program tables can be programmed into the DST via a GFL TV-set (downloading from the GFL to the DST; see GFL service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277). For explanation of the installation features of the DST, the directions for use of the DST are recommended (For the FTV1.9 chassis, download code X should be used).

5.2.2 Diagnose features for service

FTV1.9 sets can be put in two service modes via the RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM).

5.3 Service Modes

Below described sequence is only valid for the "Monitor Only Configuration". When a Receiver box is connected to the

Display Box (TV Configuration), please check chapter 5 in the Training Manual of the Receiver Box.

5.3.1 Service Default Mode (SDM)

The purpose of the SDM is:

- Provide a situation with predefined settings to get the same measurements as in this manual.
- Access to the error buffer via the blinking LED procedure
- Inspect the error buffer.
- Possibility to overrule software protections via the service pins (caution: override of software protections!).

Entering the SDM:

- By transmitting the "DEFAULT" command with the RC7150 Dealer Service Tool (this works both while the set is in normal operation mode or in the SAM).
- By pressing on a standard RC the following sequence 0, 6 2, 5, 9, 6 followed by the "MENU" key.
- By short-circuiting the SDM pin on the AVC panel (see TM Display Box chapter 7).

In the SDM the following information is displayed on the screen:

```
-----
F19DBC X.Y_12345 (1) LLLL (2) SDM (3)
ERR 02 01 44 ## ## ## ## ## ## ## ##
-----
```

Explanation notes/references:

(1) Software identification of the main micro controller (F19DBC X.Y_12345)

- F19D is the chassis name for FTV1.9 display
- B is the region identification
- C is the language cluster
- X = (main version number)
- Y = (subversion number)
- ##### are the last 5 digits of the 12nc number

(2) "LLLL" Normal display operation in hours

(3) "SDM" To indicate that the TV set is in the service default mode

(4) "ERR 02 01 44 ## ## ## ## ## ## ## ##" This line shows the contents of the error buffer (max. 10 errors). The last error that occurred is displayed at the most left position. When less than 10 errors have occurred the rest of the line is empty. When the errorlist is empty "No errors" is displayed. No duplicate errors.

Exit the SDM:

Push the "MENU" button on the Remote Control.

The SDM sets the following pre-defined conditions:

- Volume level is set to 25% (of the maximum volume level)
- Linear Audio and Video settings are set to 50%.
- Colour temperature is set to normal.

The following functions are "overruled" in SDM since they interfere with diagnosing/repairing a set

- Video blanking.
- Slow demute.
- Anti-ageing.
- Automatic switch to "Standby" when H- and/or V-sync signals are lost.

All other controls operate normally.

5.3.2 Service Alignment Mode (SAM)

The purpose of the SAM is to align and or adjust settings.

For recognition of the SAM, "SAM" is displayed at the top of the right side of the screen

Entering the SAM-menu:

- By pressing the "ALIGN" button on the RC7150 Dealer Service Tool followed by code 3140 and the "OK" button
- Standard RC sequence 062596 followed by the "OSD" button.

- By short-circuiting the SAM pin on the AVC panel (Caution: override of software protections !!)
- In the SAM the following information is displayed on the screen:

```

-----
F19DBC X.Y_12345          SAM
ERROR## ## ## ## ##
WHITE POINT
PDP TEST PATTERN    [ON/OFF]
STORE
RESET ERROR BUFFER
-----

```

The menus and submenus

White point

The white point sub menu contains the following items:

- RED
- GREEN
- BLUE
- COLOUR TEMPERATURE

PDP Test pattern

By selecting this item, all OSD disappears from the screen. The screen now changes from light grey to dark grey in a slow regular rhythm. One can so easily check if all pixels of the monitor are correct.

Store

The change values are stored in the NVM.

Reset Error Buffer

This option will reset the error buffer.

Exit the SAM:

Push the "MENU" button on the Remote Control.

SAM menu control:

Menu items can be selected with the "UP" or "DOWN" key.

Entry into the selected items (sub menus) is done by the "LEFT" or "RIGHT" key. The selected item will be highlighted. With the same "LEFT/RIGHT" keys, it is possible to increase/decrease the value of the selected item.

Return to the former screen by pushing the "MENU" button. The item values are stored in NVM if the sub menu is left.

5.3.3 Customer Service Mode (CSM) Display

FTV1.9 monitors are equipped with the "Customer Service Mode" (CSM). CSM is a special service mode that can be activated and de-activated by the customer, upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Entering the Customer Service Mode.

- By pressing on RC03333/01 the following sequence : Picture, sound, cursor up, cursor down, cursor left, cursor right followed by the button (MUTE)
- RC7150 (DST) or a standard RC by pressing the sequence 062596 followed by the button (MUTE)

Exit the Customer Service Mode.

- pressing the "MENU" or any key on the Remote Control handset (except "P+" or "P-")
- switching off the TV set with the mains switch.

All settings that were changed at activation of CSM are set back to the initial values

The Customer Service Mode information screen

The following information is displayed on screen:

```

-----
CUSTOMER SERVICE MENU
• Software version F19DBC X.Y_####)

```

- Code 1: contains the last 5 error codes
- Code 2: contains the first 5 error codes with the last received error at the most left-hand side.
- Service unfriendly modes

5.4 Error code buffer and error-codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right.

In case of non-intermittent faults, clear the error buffer before starting the repair to prevent that "old" error codes are present. If possible check the entire content of the error buffers. In some situations an error code is only the RESULT of another error code (and not the actual cause).

Note: a fault in the protection detection circuitry can also lead to a protection

The error code buffer will be cleared in the following cases:

- exiting SDM or SAM with the "Standby" command on the remote control
- transmitting the commands "EXIT" with the DST (RC7150)
- transmitting the commands "DIAGNOSE-9-9-OK" with the DST.

The error buffer is not reset by leaving SDM or SAM with the mains switch.

Examples:

ERROR: 0 0 0 0 0 : No errors detected

ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error

ERROR: 5 6 0 0 0 : Error code 6 was first detected and error code 5 is the last detected (newest) error

Error-nr	Type of Error	Possible defect/cause
1	+5V	+5V pin at mP is low.
2	8V6	8V6 pin at mP is low
3	Fan_prot	Gives an indication that 1 or more FAN(s) does not function, or that 1 or more fan control circuits is defect
4	Over-temp_prot	Temperature at the heatsink of the VsVa supply or the Preconditioner is too high
5	DC_prot	Audio-amplifier IC, its supply or the Audio amplifier is defect
6	Over_voltage_prot	Vs or Va supply voltage is too high
7	Vrr	Powersupply of the display is not correct. Ignorance of the signal during startup by the software.
8	Power_OKE	Power supply or modules that uses this voltage. If this signal is NOT activated means that all supply voltages are available (exception Audio supply)
9	Blocked NVM IIC bus	NVM IIC bus is correct
10	Blocked slow IIC bus	Slow IIC bus is correct
11	TDA9860	No acknowledge of Audio controller
12	TDA4885	No acknowledge of Video controller
13	MC141585	No acknowledge of OSD Generator
14	uPD93687G D-LBD	No acknowledge of Limesco
15	PCF8574AT	No acknowledge of I/O Expander

Error-nr	Type of Error	Possible defect/cause
16	NVM	No acknowledge of NVM
17	Communication	Fault in the communication

5.5 The "blinking LED" procedure

The contents of the error buffer can also be made visible through the "blinking LED" procedure. This is especially useful when there is no picture. There are two methods:

- When the SDM is entered, the LED will blink the number of times, equal to the value of the last (newest) error code (repeatedly).
- With the DST all error codes in the error buffer can be made visible. Transmit the command: "DIAGNOSE x OK" where x is the position in the error buffer to be made visible x ranges from 1, (the last (actual) error) to 5 (the first error). The LED will operate in the same way as in the previous point, but now for the error code on position x.

Example:

Error code position 1 2 3 4 5

Error buffer: 8 9 5 0 0

- after entering SDM: blink (8x) - pause - blink (9x) - etc.
- after transmitting "DIAGNOSE- 2- OK" with the DST: blink (9x) - pause - blink (9x) - etc.
- after transmitting "DIAGNOSE- 3- OK" with the DST: blink (5x) - pause - blink (5x) - etc.
- after transmitting "DIAGNOSE- 4- OK" with the DST: nothing happens

5.6 Fault finding tips

5.6.1 Pre-conditioner

The Pre-conditioner delivers the following output voltages:

- 5 VSTBY
- 5 VSTBY_switched
- 380 VDC
- Internal 12 VSTBY to supply the relay, which switches the mains input

To trouble shoot the pre-conditioner, first check the LED of the display-box.

- No red, green or orange LED indicates the absence of the +5Vstby_switched at the VsVa panel.

Check the +5Vstby_switched on pin 5 of connector PR08. If this voltage is present check the presence of this voltage at the VsVa-panel on pin 2 of connector FD04. See the wiring diagram of the monitor for more details.

If the voltage is not present, check R3508 and fuse 1500. In case of a defective R3508, check/replace item 7500, opto-coupler 7501, regulator 7502, and diode 6501 + 6502.

In case of an open circuit of fuse 1500, check/replace bridge 6500 and capacitor C2501.

If both component are alive, measure the voltage at pin 5 of IC7500 - Topswitch. If the waveforms resembles a burst-signal, the output is too heavy loaded. Check the output diode D6504 and capacitor C2508 of the 12VSB and diode 6505 and capacitor C2510 of the 5VSTBY.

- The red LED is blinking (+5Vstby is OK!), which is an indication of a protection.

Disconnect the VGA-cable between the E-box and the Monitor. Now the Monitor is operating as a stand-alone unit. Switch the monitor via the DST, (command "Default") or via the RC (special sequence) to the SDM.

Automatically the orange coloured LED of the monitor will blink the content of the error-buffer. If the sequence contains error-code 8, the cause could be a defective pre-conditioner. Error-

code 8 is an indication that the +5V and/or the Vs/Va of the VsVa supply are not correct.

In case of error-code 4, switch OFF the set and check the temperature of the heatsink. In case of a high temperature of the heatsink, check MOSFET T7610 and the drive-circuit around T7640, T7641 and T7608.

In case of error-code 8, remove connector PR09 from the board. Short-circuit pin 2 of T7681 to ground, simulation of "SUPPLY_ON". (Caution - Protections overruled!!!)

Measure voltage at C2616. Is voltage 380Vdc?

Yes, the cause was a too heavy load/short-circuit at the VsVa panel.

No, measure the voltage at C2606/C2607. Is this voltage a DC voltage of approx. 300V with a strong ripple at a mains-input of 230Vac? If NO, check if relay 5690 is activated via the transistors T7684 + T7690. Check also PTC's 3600, 3601 and 3602 at their resistor-value.

Voltage is present at C2606. Check/replace NFR 3663 and 3668, if one of them is an open-circuit. In case R3663 is an open circuit, check/replace diode 6660, 6661 and capacitor C2664 plus IC 7660. If IC7660 is defect, check/replace IC 7650 and C2262. In case of an open circuit of NFR 3668, replace IC 7650.

NFR 3663 and NFR 3668 are not defect. Measure waveform a base of T7608. Is a square waveform present at gate of T7610? Check/replace MOSFET T7610 and the drive-circuit around T7640, T7641 and T7608.

5.6.2 VsVa-supply

The red LED is blinking (+5Vstby is OK!), which is an indication of a protection.

Disconnect the VGA-cable between the E-box and the Monitor. The Monitor is now operating as a stand-alone unit.

Switch the monitor via the DST, (command "Default") or via the RC (special sequence) to the SDM.

- Error-code 1, check the +5V supply

Check fuse 1103. If the fuse is an open circuit, check/replace IC 7201. If fuse 1103 is OK, check the presence of the 17V. If this voltage is not present check fuse 1102 + 1104 and D6121 + D6122. If the 17V is present, then remove connector FD05. The reason could be a too heavy load or a short-circuit of the +5V supply. If after disconnection of connector FD05 the set still goes into protection, check D6203, NFR 3205 and the circuit around IC 7201.

- Error-code 2, check the 8V6 supply

Check regulator IC 7203, NFR 3099 and D6204.

- Error-code 8 there is something wrong with the POWER_OKE signal. When the POWER_OKE signal is low, the Vs and Va and the +5V are available.

Measure the voltage Va at C2120. Is the voltage between 55V and 65V? If not check fuse 1105 and D6120. If both components are OK, the cause could be a too heavy load.

Measure the voltage Vs at C2020. Is the voltage between 165V and 185V? If not check D6020. If D6020 is OK, the cause could be a too heavy load.

If both voltage are not present, check fuse 1004 at the input.

If fuse 1004 is an open circuit, check the MOSFET's 7005 and 7006 for a short-circuit. In case of short-circuit use the repair-kit.

If fuse 1004 is OK, check the voltage at pin 15 of IC 7001. Is the voltage at pin 15 approx. 16-17V? If NO, check NFR 3002 and D6002 + D6030. If YES, check the waveforms FD49 and FD50 at pin 14 and 12. If they are present, check pulse transformer 5001 and the driver-circuits around MOSFET 7005 and 7006. If the waveforms FD49 and FD50 are not present, replace IC7001.

- Error-code 5, check the audio-supply or the Audio amplifier IC.

Check/replace fuse 1201 + 1202 and diode 6201 + 6202. If the components are OK, check the audio-amplifier IC.

- Error-code 6, check the Vs and/or the Va supply voltage.

The regulation-circuit of one of these voltages is not working correctly.

For the Va supply check opto-coupler 7102 and IC 7110.

For the Vs supply check opto-coupler 7002 and IC 7010

5.7 ComPair

5.7.1 ComPair mode

The monitor, as a stand-alone unit, can be diagnosed via a PC/laptop by using ComPair via the ComPair connector. Before connecting the ComPair-cable at the AV Control panel on connector AVC34, the monitor must be put in the "ComPair - Mode ". This can be done by changing the jumpers at connector AVC39. Connector AVC39 is situated close to the up panel.

The figure below shows how to do it.

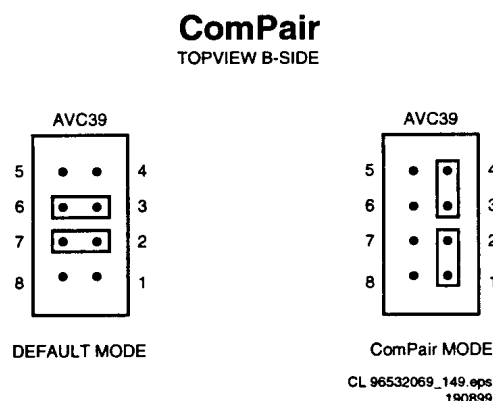


Figure 5-1

After switching ON the set, the red LED will blink as an indication that the monitor is in the ComPair mode.

5.7.2 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding how to repair the FTV1.9 in short time by guiding you step by step through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself; ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the FTV1.9 (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan FTV1.9 electronic manual, schematics and PCBs are only a mouse-click away.

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable. In case of the FTV1.9 chassis, the ComPair interface box and the FTV1.9 communicate via an I2C cable (bi-directional). The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:

1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the FTV1.9.

Automatic information gathering

Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.

Diagnosis on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the FTV1.9.

Manual information gathering

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extent. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an waveform pictures) that will bring you to the next step in the faultfinding process.

A question could be: Do you see snow? (Click on the correct answer)

YES / NO

An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

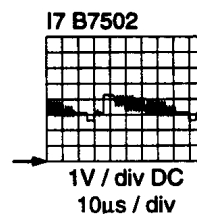


Figure 5-2

By a combination of automatic diagnostics and an interactive question/answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Additional features

Beside fault finding, ComPair provides some additional features like:

- Uploading/downloading of pre-sets
- Managing of pre-set lists
- Emulation of the Dealer Service Tool

5.7.3 Searchman (Electronic Service Manual)

If both ComPair and SearchMan are installed, all the schematics and PCB's of the faulty set are available when clicking on the hyper-link of a schematic or a PCB in ComPair. Example : Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier. Clicking on the PCB hyper-link, automatically shows the PCB with a highlighted capacitor C2568. clicking on the schematic hyper-link, automatically shows the position of a highlighted capacitor C2568 at the schematic.

5.7.4 Connecting the ComPair interface

The ComPair Browser software should be installed and setup before connecting ComPair to the FTV1.9. (See the ComPair Browser Quick Reference Card for installation instructions):

1. Connect the RS232 interface cable to a free serial (COMM) port on the PC and the ComPair interface PC connector (connector marked with "PC").
2. Place the ComPair interface box straight in front of the television with the infrared window (marked "IR") directed to the television LED. The distance between ComPair interface and television should be between 0.3 and 0.6

- meter. (Note: make sure that (also) in the service position, the ComPair interface infra red window is pointed to the standby LED of the television set (no objects should block the infra red beam))
3. Connect the mains adapter to the connector marked "POWER 9V DC" on the ComPair interface
 4. Switch the ComPair interface OFF
 5. Switch the television set OFF with the mains switch
 6. Remove the rear cover of the television set
 7. Connect the interface cable (4822 727 21641) to the connector on the rear side of the ComPair interface that is marked "I2C" (See Figure)
 8. Connect the other end of the interface cable to the ComPair connector on the monocarrier (see figure 5.xx)
 9. Plug the mains adapter in the mains outlet and switch ON the interface. The green and red LED's light up together. The red LED extinguishes after approx. 1 second (the green LED remains lit).
 10. Start-up Compair and select "File" menu, "Open..."; select "FTV1.9 Fault finding" and click "OK"
 11. Click on the <xxxx> icon to switch ON the communication mode (the red LED on the Compair interface will light up)
 12. Switch on the television set with the mains switch
 13. When the set is in standby. Click on "Start-up in ComPair mode from standby" in the ComPair FTV1.9 fault finding tree, otherwise continue.

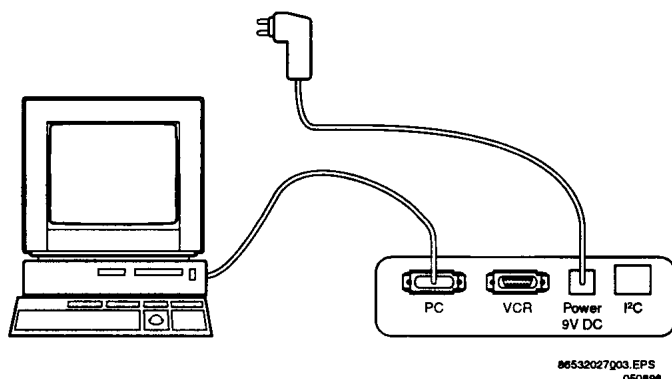


Figure 5-3

The set has now started up in ComPair mode. Follow the instruction in the FTV1.9 fault finding tree to diagnose the set. Note that the OSD works but that the actual user control is disabled

5.7.5 Preset installation

Presets can be installed in 2 ways with the FTV1.9.

- Via infra red
 - only sending TO the television
 - the rearcover does NOT have to be removed

Click on "File" "Open" and select "TV - use ComPair as DST" to use infra red

- Via cable
 - sending TO the television and reading FROM the television
 - the rearcover has to be removed

Click on "File" "Open" and select "FTV1.9 fault finding" to use the cable

Presets can be installed via menu "Tools", "Installation", "Presets".

5.7.6 Ordering ComPair

ComPair order codes:

- Starterkit ComPair + SearchMan software + ComPair interface (excluding transformer): 4822 727 21629

- ComPair interface (excluding transformer): 4822 727 21631
- ComPair transformer (continental) Europe: 4822 727 21632
- ComPair transformer United Kingdom: 4822 727 21633
- Starterkit ComPair software: 4822 727 21634
- Starterkit SearchMan software: 4822 727 21635
- Starterkit ComPair + SearchMan software: 4822 727 21636
- ComPair CD (update): 4822 727 21637
- SearchMan CD (update): 4822 727 21638
- ComPair interface cable (for FTV1.9): 4822 727 21641

General: the Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5 'Service modes, faultfinding and repair tips'.

All electrical adjustments should be performed under the following conditions:

- Supply voltage : 220 - 240 VAC (+/- 10 %)
- Warm-up time: 10 minutes
- The voltages and oscillograms are measured in relation to the tuner earth.
- Test probe: $R_i > 10\text{M}\Omega$ $C_i < 2,5\text{ pF}$.

- By transmitting the "ALIGN" command with the RC7150 Dealer Service Tool, followed by password "3140" and < OK > button.
- Standard RC sequence 062596 (within OSD time-out) OSD
- By shorting test-point M28 and M29 on the AV Control panel on the monitor while switching on the set.

Pre-conditioner +5Vstby (PR3)

Connect a voltmeter to capacitor C2510 (PR2). With the aid of R3504 adjust the voltage to 5.2 V +/- 50 mV.

VsVa supply (FD)

Va-supply (Addressing of the PDP - FD1)

De-activated the PDP.

Connect a voltmeter to capacitor C2120 (FD1). With the aid of R3126 adjust the voltage to 55 V +/- 0.5 V.

Vs-supply (Sustain pulses - FD2)

De-activated the PDP.

Connect a voltmeter to capacitor C2020 (FD2). With the aid of R3026 adjust the voltage to 165 V +/- 0.5 V.

White point

- Select the item "PDP test pattern" of the Service Alignment menu and set it to "ON".
- Select item " White point" of the Service Alignment menu.
- Enter the "white point" menu and adjust the value of one of the 4 submenu if necessary. Only the selected menu-item including its value remain on the screen when selected. The value has to changed within 5 seconds otherwise the main menu reappears again.

The 4 sub menu-items of the White point menu:

- "RED"
- "GREEN"
- "BLUE"
- "COLOUR TEMPERATURE"
- Leave the sub-menu by pressing "cursor up", "cursor down", "OK" or the "MenuOnOff" button and return to the main menu.
- Select the item "PDP test pattern" of the Service Alignment menu and set it to "OFF".

2. Circuit description and list of abbreviations

2.1 Circuit description

For a detailed description of the circuits see Training Manual FTV1.9 Display Box (3122 785 10036).

2.2 List of abbreviations

μP	Micro Processor
1FH	One time the line frequency for normal picture quality
2FH	Twice the line frequency for a better picture with less field flicker
2CS	2 Carrier Sound (sound system using two separate FM carriers at 5.5 MHz)
AARA	Automatic Aspect Ratio Adaptation
ADC	Analogue Digital Converter
ADJ	Adjust -
AFC	(S1) Automatic Frequency Control. Automatic fine-tuning circuit for signal reception.
AGC	Automatic Gain Control
AM	Amplitude Modulation
AMV	Automatic Multi Voltage
ANT	Antenna
AP	Asian Pacific region (Covering Hong Kong, Australia, Singapore etc.)
APC	Automatic Power Control
ASP	Aspect Ratio 4:3 or 14:9 or 16:9
AUD	Audio - GFL
AVB	Audio Video Buffer or Audio Video Blanking
BC	Beam current - GFL
BNC	Professional connector for higher frequencies
C	Centre
CINCH	Common connector for several kinds of signals
COMP	COMB-filter
CRT	Cathode Ray Tube
CVBS	Composite Video Blanking Synchronisation, video signal
DAC	Digital Analogue Converter
DEC	Decoder
DFB	Double Window Fast Blanking
DU	Double Window - U_signal
DV	Double Window - V_signal
DW	Double Window
DY	Double Window - Y_signal
E-Box	Electronic Box
EHT	Extra High Tension - GFL
ELPS	Eco Low Power Supply - GFL
EWD	East West Drive - GFL
EXT	External
FBL	Fast Blinking
FBX	Feature Box
FE	FrontEnd
FM	Frequency Modulation
FMS	Functional Module Specification
FRNT	Front
FRS	Functional Requirement Specification
FTV	Fiat TeleVision
GFL	Global Feature Line (high end TV chassis)
GFL-FL	GFL Feature (up)Lift
GND	Ground
HFB	Horizontal FlyBack (display system sync. pulse)
HP	Headphone

HSI	Hardware Software Interface
HW	HardWare
I/O	Input / Output
I2C	IC bus, Inter Integrated circuit, on-board communication line
IF	Intermediate Frequency
IRQ	Interrupt ReQuest.
L	Left
L_CL VL	Left_Constant_Level Variable_Level
L_REC SEL	Left_Record_Select
LED	Light Emitting Diode
LP	Low Pass
LTP	Luminance Transient Processor
MAC	(Apple) MACintosh
MAC13	or MACII (Apple) MACintosh format for 13" monitors
MACP	Motion Adaptive Colour Plus
ML-2	Media Line 2
Monitor	PDP Display with all the electronic boards (incl. self developed boards).
MU	Main U_signal
MV	Main V_signal
MY	Main Y_signal
NICAM	Near Instantaneous Companding Audio Multiplex (digital terrestrial sound)
NTSC	National TV Standard Committee
OE	(AQ) Output Enable
PAL	Phase Alternating Lines (Colour video standard)
PDP	Plasma Display Panel
PIP	Picture In Picture
PLL	Phase Locked Loop
POR	Power On Reset / Power Off Reset (depending on context)
QPSK	Quadruple Phase Shift Keying
R	Right
RAM	Random Access Memory
RC5	Remote Control 5 (infrared signal transmission protocol)
RECEI-RC5	Received RC5-code
REF	Reference
RES	Resistor
RGB	Red Green Blue, video signals
SC-1FH	Sandcastle 1FH
SCL	Serial Clock Line of the IC bus
SDA	Serial Data Line of the IC bus
SECAM	SEquential Couleur A Memoire (Colour video standard)
SIF	Second Intermediate frequency
SND	Sound
SOG	Sync On Green
SP_GAIN	Splitter GAIN
SPHsync	Splitter Horizontal Sync
SPVsync	Splitter Vertical Sync
SSP	Small Signal Panel (of the GFL chassis)
STBY	Standby
SW	SoftWare / SubWoofers (depending on context)
SYNC	Synchronisation
SYS	System
Terr	Terrestrial
TP	Testpoint
TRASN	(AQ)
TSD	Terrestrial Sound Decoder (combination of 2CS and NICAM decoder)
TUN	Tuner

TXT	TeleteXT
TXT-KILL	Teletext killer (Signal to disable Teletext)
U-VIDCONTR	U-VideoContrast
VCO	Voltage Controlled Oscillator
VD	Vertical Drive
VGA	Video Graphics Array. In this document, the term VGA is used for all VGA
WE	Write Enable
Xtal	Crystal (Oscillator)
Y/C	Luminance (Y) signal / Chrominance signal (C)
YUV	Combination of colour difference signals